

# Paper Care



Total Paper Care Solutions from a  
Single Source



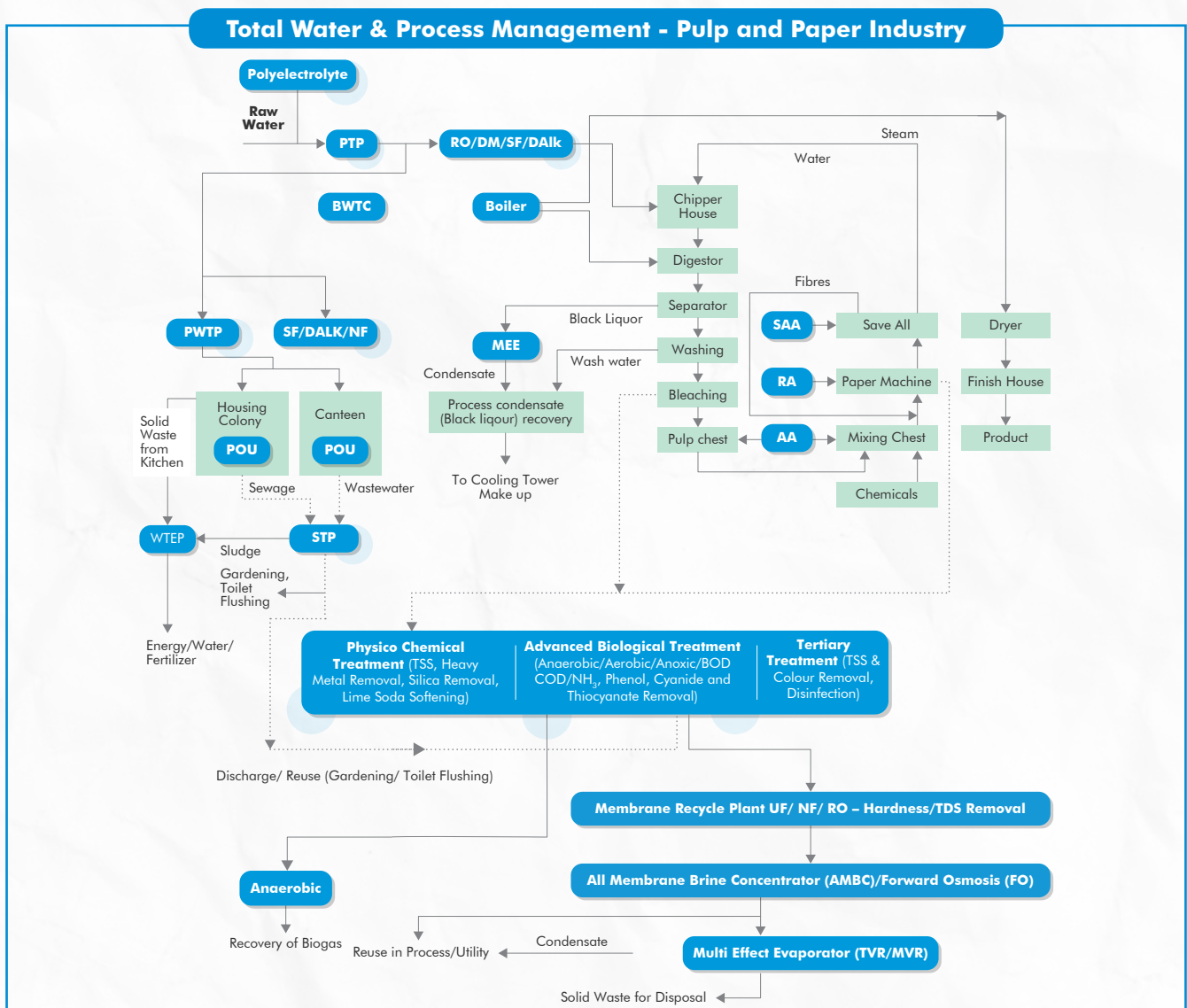
Ion Exchange pioneered water treatment in India and is today one of the largest water and environment solutions providers with a strong global presence. Our close association with the paper industry, technological expertise, R&D capabilities coupled with a thorough understanding of customer processes, have enabled us to provide 360° sustainable solutions across the entire value chain of the paper manufacturing process.

The Pulp & Paper industry is one of the largest consumers of fresh water. Most paper mills are dependent on fresh water sources that are becoming scarce and costly. The industry also generates a significant amount of wastewater. With stricter effluent discharge norms, the industry is mandated to adopt new, sustainable and efficient water and waste treatment technologies.

Ion Exchange provides a two-pronged approach to achieve these goals:

Optimizing good manufacturing practices for which Ion Exchange provides specialty process chemicals (dry and wet end chemicals), not only improves the quality and efficiency through increased processing yields but also reduce consumption of water in the manufacturing process.

We provide advanced water and waste treatment technologies beginning with a comprehensive water audit followed by substituting conventional treatment with advanced technologies and modern integrated water management processes that ensure source reduction, product recovery, waste minimization and water reuse.



- PT - Pre Treatment
- RO/DM/SF/DAlk - Reverse Osmosis/Demineralisation/Softener/Dealkaliser
- BWTC - Boiler Water Treatment Chemicals
- MEE - Multi Effect Evaporator
- SAA - Save All Aids
- RA - Retention Aid

- SF/DALK/NF - Softener/Dealkalisation/Nanofiltration
- PWTP - Potable Water Treatment Plant
- POU - Point of Use Purifiers
- STP - Sewage Treatment Plant
- WTEP - Waste & Effluent Treatment Plant
- TVR - Thermal Vapor Recompression
- MVR - Mechanical Vapor Recompression

## Pretreatment

At the pretreatment stage, our INDION range of products like Lamella Clarifier, Ultra High Rate Solids Contact Clarifier (UHRSCC), Continuous Sand Filter (CSF), Multigrade Filter (MGF) & Ultra Filtration process are the first choice for reducing high turbidity and suspended solids in the water source. These space-saving, efficient systems reduce the high suspended solids load to acceptable levels as feed for make-up water treatment systems.

### **INDION® Lamella Clarifier**

INDION Lamella Clarifier is a modular unit which achieves solid-liquid separation by directing the liquid between a series of stacked inclined plates which results in the separator having up to ten times the clarification area than a conventional circular settling tank occupying the same floor space.

### **INDION® Ultra High Rate Solid Contact Clarifier (UHRSCC)**

This compact, efficient and low cost clarifier combines processes like mixing, flocculation and sedimentation in a single basin. These modular designed units can handle high inlet suspended solids up to 3000 mg/l while giving consistent treated water quality of less than 10 mg/l and sludge concentration up to 3%. This results in elimination of the downstream thickeners further reducing the capital, operating cost and footprint of overall clarification processes.



INDION Ultra High Rate Solids Contact Clarifier (UHRSCC)

### **INDION® Multigrade Filter (MGF)**

The INDION MGF is a depth filter that makes use of coarse and fine media mixed in fixed proportion. This arrangement produces a filter bed with adequate pore dimensions for retaining both large and small suspended particles.

### **INDION® Continuous Sand Filter (CSF)**

The INDION CSF can filter influent containing up to ten times more dirt than a conventional filter. Whilst suitable also for raw water treatment to remove suspended solids and turbidity this advanced but highly simplified and efficient technology when applied (along with High Rate Solids Contact Clarifier) for recycling of water from the mills can recover fibre, filler chemicals and at the same time recycle quality treated water into the process. The INDION CSF operates continuously and does not require stoppage for backwashing thus saving large quantities of water. While many mills have used "save alls" and dissolved air floatation devices, this process can be easily accomplished with the continuous sand filter. The treated effluent can be used directly on paper machines.



INDION Continuous Sand Filter (CSF)

### **INDION® Ultra Filtration Systems**

- INDION Ultrafiltration systems remove all particulate matter, suspended solids, colloids and organics causing a reduction in Silt Density Index (SDI) and are best suited as pretreatment for reverse osmosis.

# Process Water Treatment

## INDION® Softeners

INDION Softeners are highly effective to remove scale-forming ions like calcium & magnesium from water. Strong acid cation ion exchange resins are used to exchange the scale-forming ions to soften water. After exhaustion, the strong acid cation resin is regenerated with brine solution (sodium chloride). Providing consistent good quality soft water throughout the cycle.

## INDION® Reverse Osmosis Systems

These are customised & modular systems designed to treat seawater, brackish water and industrial wastewater. These are suitable as pre-treatment to the existing ion exchange demineralisation process enabling paper mills to significantly improve water quality & substantially reduce their operational costs.



INDION Reverse Osmosis Systems

## INDION SWIFT® Demineraliser

INDION SWIFT Demineraliser is the latest advancement in automatic twin-bed deionisers incorporating state-of-the-art counter-flow ion exchange technology previously available only in large, custom designed plants. The operational cycle of the rapid-regeneration, packaged units is controlled by volume throughout, which is pre-programmed into the PLC according to the type of feed water. Regeneration takes approximately 35 minutes, after a minimum service cycle of four hours. This minimizes the need for a standby plant and a large water storage tank. As the regeneration of the cation and anion beds is simultaneous, the effluent streams are largely self-neutralizing, reducing waste disposal costs and environmental impact.



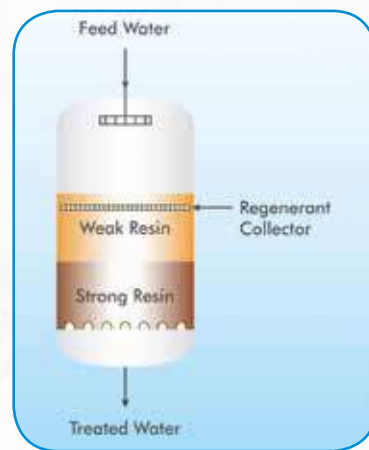
INDION SWIFT Demineraliser

## INDION® Layered Bed Demineralisers

Depending on the end use application, different ion exchange resin columns and membrane process can be selected.

- **INDION® Layered Bed Cation System**

INDION Layered Bed Cation unit is a single vessel system with layers of two resins. INDION weak acid cation resin is above the INDION strong acid cation resin with down flow service. The layered bed cation system provides high chemical efficiency while providing significant savings in capital cost & lower footprint.



INDION Layered Bed Cation System

- **INDION® Layered Bed Anion System**

INDION Layered Bed Anion unit is a single vessel system with layers of two resins, weak base anion is above the strong base anion with downflow service. The layered bed cation system provides high chemical efficiency while providing significant savings in capital cost & lower footprint.



INDION Layered Bed Anion System

# Waste Water Treatment

## **INDION® External Circulation Sludge Bed (ECSB)**



INDION High Rate Anaerobic Treatment

The INDION ECSB uses advanced engineering material for the internal phase separation of anaerobic sludge, water and biogas. It is constructed using bolted steel plates in a tall configuration thereby further reducing the footprint whilst optimizing bio energy generation and producing treated effluents of

the highest quality, reducing the footprint and life cycle cost of downstream aerobic systems.

ECSB process coupled with wide options of INDION Aerobic processes (ASP / MBBR / SBR / MBR) + INDION Membrane Processes (UF / RO) + INDION MEE provides cost effective, proven, turnkey solutions for the pulp and paper industry.

## **INDION® Sequencing Batch Reactor (SBR)**

INDION SBR is a cyclic activated sludge treatment system. Its compact design is based on sequential time cycle for equalization, aeration, settling and clarification which provides several advantages over conventional activated sludge processes.



INDION Sequencing Batch Reactor (SBR)

## **INDION® Membrane Bio-Reactor (MBR)**

The INDION MBR is among the latest technologies in biological treatment, designed to produce high quality treated water from waste water with highest possible contamination reduction without using any chemicals.

## **INDION® Fluidised Media Reactor (FMR)**

## **INDION® Moving Bed Bio-Reactor (MBBR)**

INDION FMR is designed as a single tank unit, incorporating a bar screen chamber, specially developed synthetic media to facilitate attached growth process, oxygen transfer through diffused membrane aeration, a lamella settler and a chlorine contact tank for disinfection.

## **INDION® New Generation Packaged Sewage Treatment Plant (NGPSTP)**

It is a unique combination of lamella plate clarification and aeration that results in a ready-to-operate, pre-fabricated solution of outstanding performance and efficiency for sewage treatment.

## **INDION® Activated Sludge Process (ASP)**

The INDION ASP treats wastewater effectively using aeration and a biological floc composed of bacteria and protozoa.

## **INDION® UF-RO Recycle Systems**

Ultrafiltration is a low pressure membrane system mainly used as a pre-treatment to reverse osmosis to remove physical impurities in waste water stream (Suspended solids, colloidal silica, macro organics etc). Reverse osmosis is used for separation of salts in waste water for producing good quality water for reuse in process.

## **INDION® Zero Liquid Discharge (ZLD) Systems**

Our recycle & zero liquid discharge systems integrate physico-chemical, biological and membrane separation processes for optimum water recovery. These are integrated with our state-of-the-art Multi-Effect Evaporator (MEE) to ensure compliance with strict discharge norms and achieve excellent payback on investment.

We offer the widest range of evaporators like Falling Film (FF), Forced Circulation (FC), Agitated Thin Film Dryer & Crystallizers with options (i.e) Mechanical Vapour Re-compression (MVR), Thermal Vapour Re-compression (TVR)

## **INDION® All Membrane Brine Concentrator (AMBC)**

INDION AMBC uses a highly concentrated draw solution that concentrates the feed brine without increasing pressure beyond the conventional 70-80 bar. High concentrated feed is collected in the brine feed tank. The pressurized feed is delivered to the feed side of the AMBC membranes by the AMBC high-pressure pump. Concentrate of this module is disposed of/fed to MEE. This results in making the ZLD concept more affordable by significantly reducing the capital, operational expenditure & footprints.

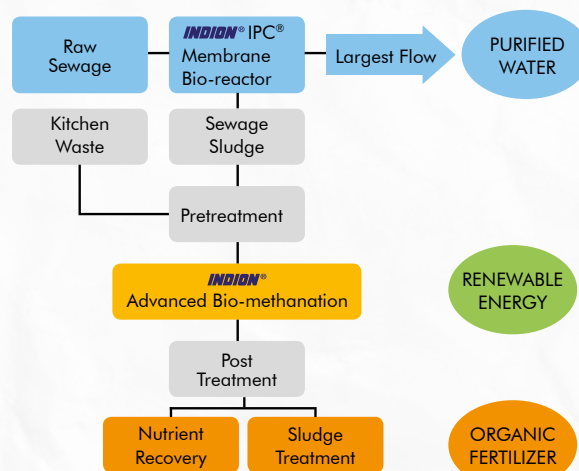


INDION All Membrane Brine Concentrator (AMBC)

## Waste-To-Energy

### Integrated Waste Management System with recovery of Purified Water, Renewable Energy & Organic Fertilizer

The INDION Integrated Waste Management System is an advanced process for treating liquid waste (sewage/sullage) and organic kitchen waste (generated in homes & communities), using state-of-the-art technologies such as the INDION IPC MBR and INDION Advanced Bio-methanation process.



## Speciality Applications

### Coatings Recovery

Ion Exchange's advanced INDION Ultra Filtration Specialty Membrane systems remove suspended solids and also recover coatings which can be re-used in paper making process. It also causes significant reduction of COD (up to 90%) in the washing solution which is then sent to the Effluent Treatment Plant (ETP). The system reduces load on the ETP resulting in savings on ETP cost to treat high TDS & High COD discharge.

### Colour Removal from Paper Waste Streams

The Paper industry generates vast volumes of coloured effluents from washings of various process lines and equipments. Ion Exchange's modular and compact INDION Nanofiltration (NF) Membrane System offers a cost effective way to remove colour while causing a greater than 90% COD reduction, reducing load on the ETP and in the process recovering water which can be reused for various plant processes.

## Speciality Water Treatment Chemicals

### INDION® Boiler Water Treatment Programmes

Our wide range of boiler water treatment chemicals consist of multipurpose formulations containing hardness treatment chemicals, instant oxygen scavengers, corrosion control agents, polymeric sludge conditioners and sequestrants that provide trouble-free operation and clean boilers.

### INDION® Cooling Water Treatment Programmes

Our cooling water treatment program consists of scale control additives, corrosion inhibitors, dispersants to control fouling by suspended solids and metal oxides, silica scale inhibitor, high-stress scale retardants, bio dispersants, oxidizing biocides, non-oxidizing biocides, scale and corrosion inhibitors for closed system & resin defoliants.

### INDION® AutoChem Ultima

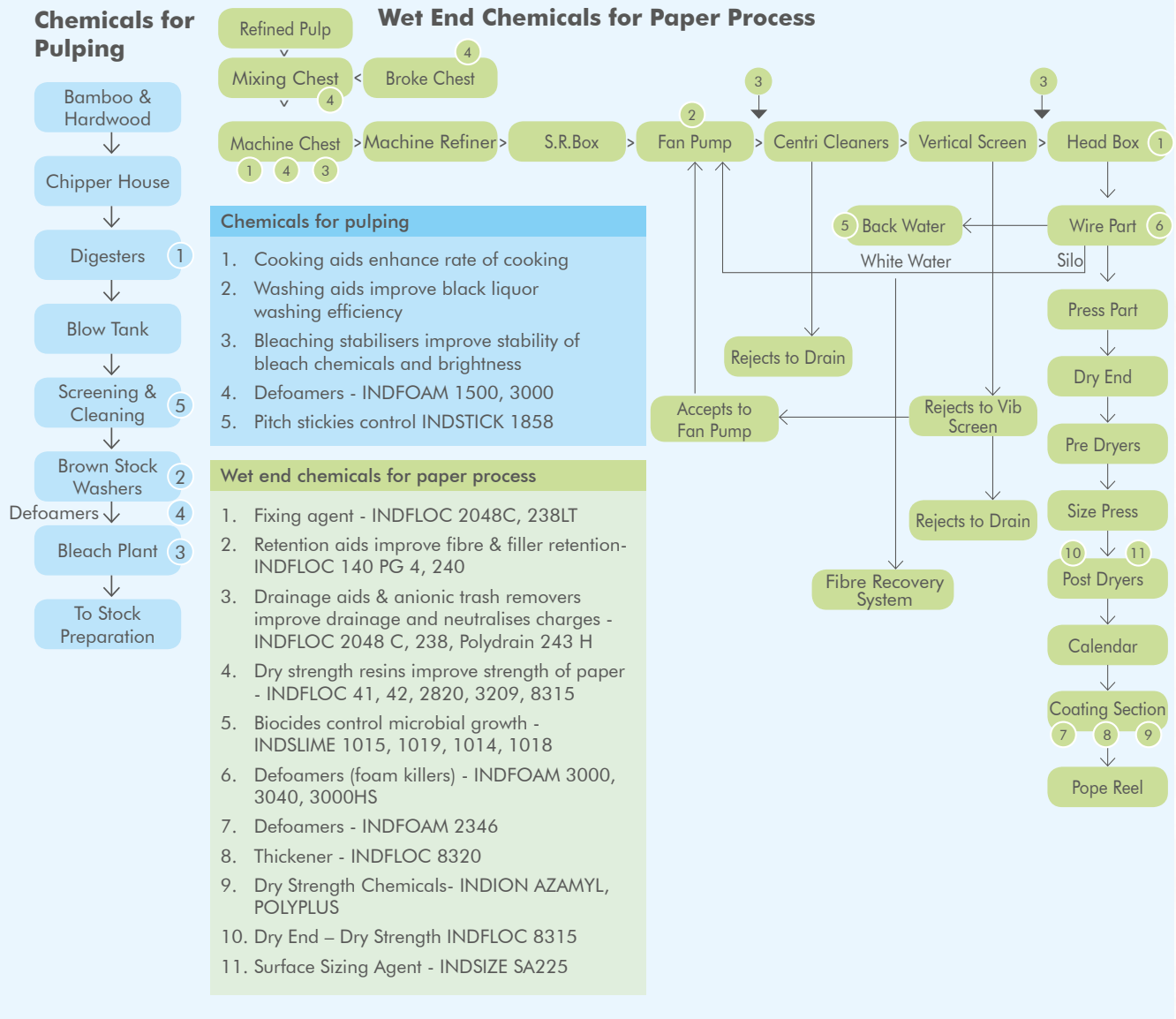
Our cooling and boiler water treatment chemical solutions are supported by INDION Autochem Ultima system for real-time monitoring, analysis and control of the treatment program leading to greater performance efficiency, cost optimization and environment, health & safety compliances.



INDION Autochem Ultima

# Speciality Performance and Process Chemical Programmes

## Process Chemicals for Pulp & Paper Mills



Product	Application
<b>Dispersing Applications</b>	
INDSPERSE 1938	Coating dispersant
INDSPERSE 1945	Clay dispersant for calcium carbonate, soap stone powder
<b>Clarification and Colour Removal Agents</b>	
INDFLOC 857M	Colour removal chemicals used for chlorophoric groups and to decolourize lignin
INDFLOC 859M	Colour removal chemicals used for chlorophoric groups and to decolourize lignin

Product	Application
<b>Polymers for Water &amp; Effluent Treatment Plants</b>	
INDFLOC 244	Flocculation aid
INDFLOC 245	Flocculation aid
INDFLOC 27	Flocculation aid
INDFLOC 419	Krofta flotation & settling aid
INDFLOC 424	Krofta flotation & settling aid
INDFLOC 441	Settling Aid
INDFLOC 442	Settling Aid
INDFLOC 443	Settling Aid
INDFLOC 445	Settling Aid
INDFLOC 465	Dewatering aid

# Our Product Specialities

## INDION® Resins

INDION ion exchange resins manufactured in an advanced & automated facility are characterized by exceptional physical stability and exchange capacities. These are available as Gaussian and Uniform Particle Size beads in dry and moist forms with varying surface areas, porosity and matrix as suitable for different applications. Indion resins are widely used by leading paper mills to treat water for process, utility and waste treatment applications like water softening, demineralization, condensate polishing, colour & odour removal, separation & purification and catalysis.

## Adsorbents, RO Antiscalants, Cleaners, Chemicals & Critical spares

INDION antiscalants are available in a wide range of product formulations for enhancing the performance of reverse osmosis and multi-effect evaporator systems against soluble and insoluble impurities that cause excessive scaling, fouling resulting in rapidly and in many cases irreversibly deteriorating the performance of the system. Our INDION range of multi-formulation cleaners enhance the performance of membrane and evaporator system's with efficient and cost-effective cleaning of fouled surfaces thereby maintaining the system's performance.

## HYDRAMEM® Membranes

Hydramem high performance Reverse Osmosis (RO), Nano filtration (NF) and Ultra filtration (UF) membranes are manufactured in a state-of-the-art, completely integrated and automated membrane manufacturing plant and belong to the latest generation of membrane technology.

Hydramem RO and NF membranes complement INDION ion exchange resins for removal of ionic contaminants from source waters.

Hydramem UF membranes available in different configurations and molecular weight cut-offs, produce treated water free from particulate colloidal and microbiological contaminants making them suitable for requirements that need lower footprint and high flow rates as compared to conventional processes.



## Services

Our 24 X 7 Comprehensive Services help to maximize production and performance levels by ensuring continuous, optimum performance of your paper plants. Our services includes:

- Total paper care & water management consultancy

- R&D, feasibility & pilot plant studies
- O&M contracts & Water audits
- Membrane cleaning service contracts & emergency services

**24/7**  
service

Our state-of-the-art manufacturing facilities are ISO 9001, ISO 14001 & ISO 45001 certified.

To the best of our knowledge the information contained in this publication is accurate. Ion Exchange (India) Ltd. maintains a policy of continuous development and reserves the right to amend the information given herein without notice. Please contact our regional/ branch offices for current product specifications.

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