

## Sweetening the Sugar Manufacturing Process

Ion Exchange (India) Limited is the leader in speciality solutions for the sugar industry.

Our superior, high performance products and processes are widely used in solid and liquid sugar manufacture.





Ion Exchange (India) Limited offers sugar mills a wide range of solutions, products and services that have been specially developed for diverse applications in the processes of liquid and solid sugar manufacture. These, together with our innovative sugar remelt decolourising process and total water management provide complete solutions to sugar mills and refineries enabling them to achieve significant competitive advantage.

## **INDION® Total Environment Management and Product / Processes for Sugar Industry**

Indicative of our customer-centric, solution-oriented approach, Ion Exchange offers the sugar industry synergistic solutions that address the need for quality products for sugar production as well as water and waste water treatment / recycle.

### **The Sugar Industry and Water**

In the sugar industry, cogeneration plants are installed to produce power for grid supply. The by-product bagasse is fully utilised as fuel for the boiler while turbines form the heart of the cogeneration plant. Organic and inorganic material present in surface water can lead to scaling, corrosion and fouling of boilers and turbine blades. It is thus extremely critical that the quality of boiler feed water meets requirements.

The industry also requires huge volumes of water for its production processes. Increasing water scarcity necessitates good water management and water conservation practices such as recycle / reuse of condensate & waste water and water harvesting. Indeed, the sugar and associated industries (such as distilleries and ethanol plants) are being compelled towards 'zero discharge' of liquid effluents.

Ion Exchange brings, to the sugar industry, the entire range of water and waste water treatment / recycle solutions - filters, clarifiers, demineralisers, softeners, reverse osmosis plants, ion exchange resins, chemicals, membranes, instruments - all backed by the largest service network in the water treatment industry in India.

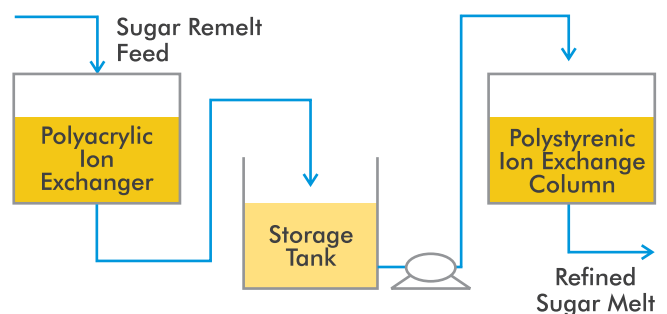
### **Water Treatment in Cogen Sugar Plants**

Apart from effectively removing inorganic constituents from surface water using ion exchange demineralisation and reverse osmosis processes, there is a need to address the problem of non-reactive silica or colloidal silica as well as the TOC in surface water. Our specially designed ultra high

rate clarifiers (UHRC) and improved filtration technology such as ultra filtration and nano filtration help reduce the problem by over 95%.

### **Sugar Remelt Ion Exchange Decolourising Process**

INDION ion exchange sugar refining process helps decolourise sugar remelt after pretreatment methods like phosflotation or carbonation. It operates by passing the pretreated sugar melt through a combination of specially suited ion exchange resin columns. These resins have the capacity to adsorb the colour precursors. The exhausted resin bed can be effectively regenerated using sodium chloride solution.



### **Benefits**

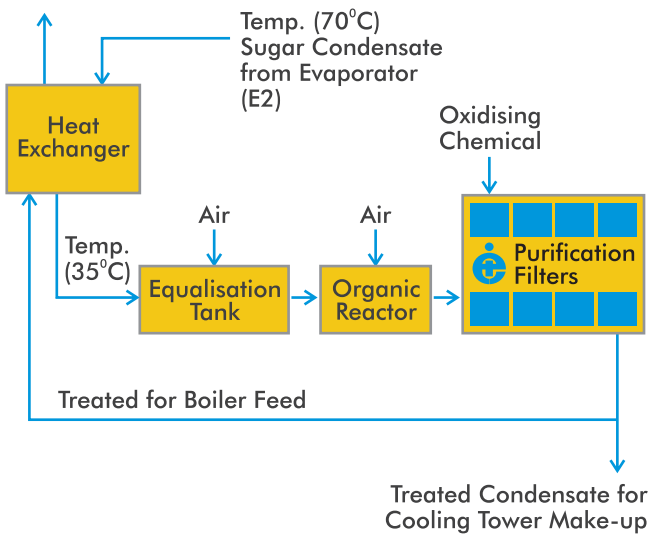
- Effective colour removal capacity
- High efficiency
- Good adsorption
- Works at higher mechanical and osmotic pressure. Hence, longer life
- High resistance to fouling
- Simple and economical

## Sugar Condensate Recovery

Sugarcane contains 60-70% water. This is generated in the form of sugar condensate vapour during the juice concentration process that is carried out in multiple effect evaporators. Sugar condensate from E2 body has a temperature of 65-85°C and contains organics and dissolved impurities that need to be treated. Post treatment, using organic reactors and purification filters, sugar condensate can be recovered for re-use as boiler feed and cooling tower make-up water.

The organic reactor is designed as a single tank unit, incorporating a bar screen chamber, specially developed synthetic media to facilitate attached growth process and oxygen transfer through diffused membrane aeration.

Treated Condensate  
for Boiler Water Make-up  
Temp. (60-65°C)



### Benefits

- Treated condensate can be used as boiler water feed, cooling tower make-up water and for other applications
- Water wastage can be reduced upto 80%
- Heat recovery from condensate for preheating boiler water feed
- Quick start up with prefabricated engineered products such as fluidised media reactor (FMR)
- Complete turnkey solutions with 24x7 operation and maintenance
- The sludge can be used as fertiliser
- Helps in achieving zero liquid discharge

**24/7**  
service



## SWIFT Demineraliser

The INDION SWIFT DM is a state-of-the-art, fully automatic, skid mounted demineraliser that assures quality supply of high purity water for cogeneration and for sugar manufacturing.

### Benefits

- Compact skid mounted design
- No erection work at site. Quick start-up
- Self neutralised effluent
- Treated water quality with conductivity between 1 and 0.1 microsiemens / cm
- Touch screen HMI with audible alarm
- High chemical efficiency with regeneration time of only 35 minutes
- Minimises the need of standby plant and big storage tank
- Low environment footprint

## Mill Sanitation Chemicals

These are specifically developed organic biocides for improved sanitation / hygiene in sugar cane juice and sugar mills. They are vastly superior to conventional chemicals like ammonium bifluoride, bleaching powder and other halogen compounds.



### Benefits

- Effective control of biological growth in sugar juice
- Prevention of loss of vital sugar by avoiding inversion
- Improved sanitation of mill surroundings

## Defoamers / Antifoams

INDION defoamers / antifoams are used in the sugar process (cane / beet sugar) and provide superior and persistent knock-down performance. The use of these non-silicon, non-mineral oil based, environmentally safe defoamers / antifoams result in excellent defoaming action leading to good quality sugar and liquor recoveries.

### Benefits

- Restricts foam generation & controls excess foam which would otherwise create process problems
- Environmentally safe and biodegradable
- Leaves no residues in sugar / liquor
- Easy to apply and low dosages required

## RO Antiscalants

Distillery waste water has very high COD levels and reverse osmosis (RO) downstream used by distilleries usually encounter the problem of frequent biological choking.

INDION antiscalants prevent fouling and scaling of membranes, hence restoring high performance of membrane systems and protecting your investment.

### Benefits

- Restricts deposition on membranes due to all types of scales and foulants
- ANSI / NSF certified
- Maintains cleaner membrane surfaces by dispersing particulate foulants
- Effective over a wide pH range
- Compatible with most commercially available RO membranes (spiral and disc type)
- Can work reasonably well even when there are high levels of organics, silica & colloids



## Scale Inhibitors

These water-soluble surfactants have high dispersing power towards inorganic salts. In the evaporators, they inhibit scale formation by modifying the crystals, improving heat transfer and crushing capacity between cleanings.



### Benefits

- Improved heat transfer through clean evaporating surfaces
- Reduced steam / fuel consumption
- Minimum number of cleaning per season
- Prevention of over-loading of vacuum pans
- Enhanced equipment life

## Colour Precipitant

This is a highly effective cationic polymer designed for improving colour of sugar remelt / syrup in sugar mills and sugar refineries. It also removes certain high molecular weight impurities present in sugar remelt and syrup. Additionally, it helps to convert impurities into primary flocs in the subsequent process of phosflotation.

### Benefits

- Removes certain colouring matter from sugar remelt / syrup
- Improves colour of sugar remelt / syrup

## Flotation Aid

This is a high efficiency polyelectrolyte designed for improving clarification and filtration of sugar remelt / syrup in sugar mills and sugar refineries. It is effective over a wide pH range and has great flexibility in coping with fluctuations in operating conditions because of its remarkable flotation properties.

### Benefits

- Lower retention time
- Reduced mud volume
- Low pol content in filtrate
- Increased throughput from the clarifier
- Improved sugar remelt / syrup quality
- Higher filtration rate

## Viscosity Reducers

These organic chemicals have been exclusively developed for lowering the viscosity of massecuites in the pan. By reducing surface tension, they improve boiling efficiency, crystallisation, centrifugation and exhaustion of molasses - all resulting in improved sugar crystals and sugar recovery.



### Benefits

- Improved fluidity
- Reduced boiling time
- Improved circulation

## Boiler Water Treatment Programmes

Specially developed for sugar boilers, these are boiler water treatment chemicals with multi-purpose formulations containing hardness treatment chemicals, instant oxygen scavenger, corrosion control agents, polymeric sludge conditioners and sequestrants to provide trouble-free operation and a clean boiler.



### Benefits

- Economical and easy to handle
- Prevention and removal of deposits
- Protection of system from corrosion

## Bagasse / Fuel Additives

These are specially developed fireside chemicals for sugar boilers having multi-purpose formulation to reduce problems like clinker formation and deposits, resulting in higher boiler efficiency.

### Benefits

- Increased combustion efficiency
- Reduced deposit formation
- Reduction of unburnts
- Reduced frequency of soot blowing
- Reduced fuel consumption
- Elimination of glassy scales

## Cooling Water Treatment Programmes

The cooling tower, an integral part of the cogeneration plant, requires to be run at maximum efficiency with low operating cost. Ion Exchange are specialists in state-of-the-art technology for cooling water treatment chemicals.



### Benefits

- Prevention of cooling water related problems such as corrosion, scale fouling and microbial growth in cooling water systems
- Our cooling water treatment programmes ensure consistency in heat transfer at the metal surface



## Water & Juice Analysis Kit

A specially designed test kit to determine the scaling and corrosion potential of water and juice. It assists in monitoring boiler / cooling water, scale inhibition and other chemical treatment programmes.



### Benefits

- Quick, easy analysis of scale forming components such as  $\text{CaO}$ ,  $\text{SO}_4$ ,  $\text{SiO}_2$ ,  $\text{PO}_4$ , total hardness, sulphite, pH etc.

## INDFLOC® Flocculants

These water-soluble polyelectrolytes of high molecular weight have high flocculating power towards suspended solids. Designed to excel in critical areas of composition, molecular weight distribution and ionic charge, they provide efficient clarification of sugar cane juice and are available in solid, liquid and emulsion forms.

### Benefits

- Increased throughput from existing equipment
- Reduced capital expenditure on clarifiers
- Lower retention time, lower heat loss and minimum sugar inversion
- Reduced lime consumption and minimum decomposition

## Activated Carbon

In liquid sugar production, activated carbon is used for colour removal to produce the crystal clear syrups demanded by the food and beverage industries. In addition to decolourising, activated carbon also removes taste and odour compounds by adsorption. Activated carbon may be used either alone or in conjunction with other decolourising agents and systems.



### Benefits

- Crystal clear syrup
- Removal of unwanted taste and odour





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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