Efficient Extraction of Sucrose Solutions for the Sugar Industry

Boilers
- Boilers Efficiency, Environment, Safety, Automation Systems
- Blowdown control and heat recovery system
- Steam distribution header: piston valves and compact thermodynamic traps

Cogeneration Plant / Power House
- Turbo supervisory system for turbine
- Steam and water analysis system
- Pressure reducing and desuperheating stations
- Exhaust steam desuperheating system

Boiling House
- Imbibition flow control system
- Juice flow stabilisation system
- Lime sulphitation control system
- Brix measurement
- Flow, mass flow and level measurement

Steam Systems in Boiling House
- Compact module two orifice float traps for steam and vapour lines
- Level controlled condensate evacuation system
- Flash recovery and steam driven condensate return system
- Condensate contamination detection and flow diversion system

Distillery
- Flow and brix meter for spent wash fired boiler
- Control valves
- Flow, mass flow and level measurement
- Distillation column automation
- Alcohol dispensing system

Steam Systems in Distillery
- Steam operated pump trap for condensate evacuation under stall condition
- Flash recovery and condensate return system

Stack Emission, Sugar Plant ETP Discharge and Distillery Zero Liquid Discharge (ZLD) Monitoring

Thermal Energy Audit and Energy Conservation Solutions for Integrated Sugar Complex with Attractive Return on Investment
India is a leading producer of sugar globally. The sugar industry forms the second largest agro-based industry in the country. The sugar industry produces around 300-350 million tonnes (MT) cane, 20-22 MT white sugar and 6-8 MT jaggery and khandsari to fulfil the domestic consumption of sweeteners. The industry exports around 1300 MW of electricity, bio-ethanol, bio-manure and chemical contribute about 1% to the National GDP. The sugar industry in India remains regulated and is a source of livelihood for 50 million farmers and their families. It provides direct employment to over 5 lakh skilled and semi-skilled labours in sugar mills and allied industries across the nation.

With changing times, the industry is facing challenges of profitability. These challenges are governed by external factors like costs i.e. sugarcane FRP (Govt. controlled) and market controlled income i.e. sugar price, power tariffs, ethanol price and policies. It is, therefore, imperative that sugar plant optimise processes, save energy, produce more power, save bagasse and generate additional income through it.

For over 7 decades, we have partnered the industry in studying plant processes, steam circuits and extending solutions with very attractive return of investments, to address bottlenecks and help conserve energy. Our fully engineered solutions for a sugar plant, have a typical return of investment of approximately 1 to 2 seasons.
Boiler Efficiency, Environment, Safety Automation System (BEESAS)

BEESAS ensures intelligent safety, smart controls, peak efficiency and lowest downtime at all operating conditions of the boiler. It is fully automatic with no manual intervention, and hence, no compromise on safety, performance and efficiency of the boiler which results in guaranteed savings.

Benefits

Intelligent safety: Ensures that the boiler always starts, runs and stops in safe operation. Safety management system incorporated.

Smart controls: Pressure, feeder, forced and induced draft controls

Smart GUI: Interactive GUI, easy to operate

Real time data trends and patterns

DCS control platform connectivity (optional) (redundancy, hot swapping, large data-event logging and remote monitoring)

Direct and indirect efficiency analysis: Self-learning to identify the best operating point

Smart feeder control: Heart of the system. Automated feeder control, ID control and FD air control.

Drum level control: To minimise the shrinking and swelling effect in the boiler drum for enhanced steam quality

Drum TDS control: To enhance the boiler life by maintaining the hardness below unsafe limit

ID and FD draft control: Furnace draft controlled in band of 1 to -5 mmWC and FD regulated through O₂ trim
Boiler

Boiler Blowdown Control and Heat Recovery System

In many plants, blowdown is a manual and pre-scheduled activity, where the blowdown is vented to drain. An automated blowdown control system ensures blowdown is done only as and when required, thereby ensuring efficient operations. Through online TDS measurement, the set TDS level is continuously maintained.

The heat from the blowdown is recovered using a well designed flash vessel. The flash steam generated at preset pressure is routed to the deaerator. The hot condensate from the flash vessel is then routed through the heat exchanger to be used for preheating either make-up water or return condensate or juice.

Benefits

- Increased boiler efficiency
- Reduction in bagasse consumption
- Steam consumption in deaerator reduced by 3-4%

Superheated Steam Distribution Header Piston Valves

With gate valves for isolation on the header, gland sealing leakages is an issue. The condensate from this distribution header is evacuated through a globe valve of size of 2 inch or 3 inch, depending on the header size. During plant start-up, a substantial amount of condensate is formed in this area. The start-up time varies between two to eight hours. During this start-up time, the entire condensate formed in this header is drained by the globe valves, resulting in a substantial amount of heat loss. This continues even after the warm up due to the passing globe valve or through gland leakage.

We offer to study the existing superheated steam distribution header and recommend correct drip leg size and location of the trap.

Forbes Marshall piston valves are the best technical fit to cater to isolation applications.

Benefits

- Class VI bubble tight shut-off
- No gland leakage with glandless design
- No water hammer effects
- Soft seated sealing
- In-line maintenance
- No wire drawing
Compact Module Thermodynamic Traps

A properly engineered compact trap based condensate evacuation system, results in substantial reduction in the energy lost during plant start-up. The Forbes Marshall compact module thermodynamic steam trap with built-in piston valves is the ideal mainline trapping solution to handle varying loads.

Benefits
Ease of installation
Low cost of ownership due to less inventory
Reliable performance guarantees improved uptime and reduced safety hassles
Reduced noise level and erosion for applications with open to atmosphere discharge
Quick and easy inline / online maintenance
Less wear and tear

Vibration Monitoring for Rotating Equipment

We offer simple, compact and reliable velocity vibration transmitters, to monitor the imbalance/ wear and tear of bearings of critical rotating machines.

Pumps and motors: BFWP, CEP, etc.
Fans and motors: ID, PA, SA, FD, CT, ACC, etc.
Gear boxes / fiberizer / mill rollers / HT motors / compressors
A properly engineered compact trap based condensate evacuation system results in substantial reduction in the energy lost during plant start-up. The Forbes Marshall compact module thermodynamic steam trap with built-in piston valves is the ideal mainline trapping solution to handle varying loads. **Benefits**

- Ease of installation
- Low cost of ownership due to less inventory
- Reliable performance guarantees improved uptime and reduced safety hassles
- Reduced noise level and erosion for applications with open to atmosphere discharge
- Quick and easy inline / online maintenance
- Less wear and tear

Vibration Monitoring for Rotating Equipment

We offer simple, compact and reliable velocity vibration transmitters, to monitor the imbalance/ wear and tear of bearings of critical rotating machines.

- Pumps and motors: BFWP, CEP, etc.
- Fans and motors: ID, PA, SA, FD, CT, ACC, etc.
- Gear boxes / fiberizer / mill rollers / HT motors / compressors

Boiler

Water, steam and air are used at various stages. It is important to precisely control the pressure, temperature, flow and level of these fluids, depending on the application.

We offer,

- Boiler blowdown control valves (continuous and intermittent)
- Soot blower control valve
- Start-up feed water control valve
- Feed water pump re-circulation valve
- Main feed water control valve
- Superheater attemperator spray control valve
- Deaerator level control valve
- Deaerator pegging steam control valve
- Condensate recirculation valve
- High and low pressure drain valve
- Spring loaded safety relief valve (AMSE Sec. VIII)
- Silencers
- Combined pressure reducing and desuperheating valve
Complete Turbo Supervisory System for Turbine with Monitors and Sensors

Monitoring vibrations of the complete turbine, shafts, gear-box and alternator for any misalignments, wear and tear and imbalance with casing expansions is most crucial. Forbes Marshall offers a complete solution along with sensors, cables, mounting accessories, monitors, spares and support services for installation, calibration, maintenance and analysis as well. We also offer expert services through remote analysis.

Benefits
Remote vibration monitoring solution
One-stop-shop for engineering, supervision of erection and commissioning, spares and support services
Consultancy services with calibration service and certification during overhauling, as desired by insurance agency
Backward integration with existing systems of other make
Ease of replacement of compatible sensors and monitors on one-to-one basis

Steam and Water Analysis System

Monitoring chemical parameters for water and steam at various points in the boiler and turbine section is a must for the healthy upkeep of the plant. Forbes Marshall offers sample handling and conditioning system (wet panel) along with all the analysers for pH, conductivity, specific conductivity, DO, silica, sodium, phosphate, etc. in the boiler feed water, drum steam, superheated steam and condensate. The system helps prevents damage to and increase efficiency of the turbine and boiler tubes by monitoring the parameters leading to corrosion and erosion.

Benefits
Ease of operation and maintenance
Systems compliant with local and international standards
Compact and modular design
Small footprint, easily expandable
Engineering, supervision of erection and commissioning, spares and support services
Support through annual maintenance contracts and training of plant operators
One-to-one compatible sensors and monitors
Easy to integrate and/or switch over from other makes
Pressure Reducing and Desuperheating Stations (PRDS)

Design, manufacturing, supply and support services with process guarantee for PRDS for turbine bypass, ejector steam, etc. Plant specific engineered desuperheater for exhaust steam with complete engineering and process guarantee, to ensure constant temperature steam required for good quality process in the plant.

Benefits
Ease of operation and maintenance
Compact foot print
Engineering, supervision of erection and commissioning, spares and support services
Complete engineered solution with process guarantee for superheated steam and exhaust steam temperatures
No condensate being drained
Get away from issues with balloon type desuperheaters and waste drain of condensate

Turbine Exhaust Desuperheating Station

The turbine in the cogeneration plant of a sugar mill is driven by superheated steam from the boiler. The turbine exhaust steam is low pressure, however superheated. To obtain saturated steam, a desuperheater is required. A balloon type desuperheater has its own design and performance limitations. Even a nozzle type desuperheater, if not engineered properly, can affect the sugar process in terms of quality and consistency.

The perfectly engineered Forbes Marshall fixed nozzle desuperheater is paired with a spray control valve to eliminate all the above technical issues. We recommend a minimum of 4m of straight length from the point of water injection, feedback temperature sensor to be located at 12m distance and no trap in between. This will ensure spray in perfect mist form, homogenization of water with consistent delivery of steam and high quality steam for the boiling house.

Benefits
Supply of consistent and quality saturated steam with constant temperature for sugar process
Saves energy and optimises the process by eliminating pumping of excess quantity of spray water and subsequent draining of the same at the outlet
No temperature variations
No condensate drainage
Adding the appropriate quantity of hot water in the last mill, to extract maximum sucrose from the cane, is important. Forbes Marshall offers a complete imbibition flow control system with electro-magnetic flow meter, pneumatic globe control valve and suitable controller.

**Benefits**
- No manual intervention
- Speedy process
- Increased reliability
- One point monitoring and controlling

---

Ensuring constant juice flow to evaporators in the boiling house is a task. Forbes Marshall offers a complete system consisting of the coriolis mass flow meter with built-in brix, density and temperature measurements and/or electro-magnetic flow meter for juice flow measurement, pneumatic globe control valve on the re-circulation line, radar level transmitter for tank level monitoring and suitable controller for this with single point responsibility.

**Benefits**
- No manual intervention
- Speedy process
- Increased reliability
- One point monitoring and controlling
Adding the appropriate quantity of hot water in the last mill, to extract maximum sucrose from the cane, is important. Forbes Marshall offers a complete imbibition flow control system with electro-magnetic flow meter, pneumatic globe control valve and suitable controller.

Benefits
- No manual intervention
- Speedy process
- Increased reliability
- One point monitoring and controlling

Lime Sulphitation Control System

Adding the exact quantity of milk of lime (MoL) into the sugarcane juice to clarify it from impurities and get white crystals is a crucial process.

Forbes Marshall offers a complete lime sulphitation control system consisting of,
- ⁰Brix analyser for MoL concentration
- Electro-magnetic flow meter for measuring flow of sugarcane juice and MoL
- Pneumatic notch valve for MoL and pneumatic butterfly/ damper valve for SO₂ gas control
- Multi-loop controller with logics
- pH sensor in retractable holder with built-in cleaning facility for consistent and reliable pH measurement

Benefits
- Completely automated with proven logic and systems, no manual intervention required
- Consistent quality process, to ensure whitest crystals with reduced cycle time
- Increased reliability
- One point monitoring and controlling
- Online pH measurement using auto-retractable and auto cleaning of pH sensor
- MOL flow and ⁰brix measurement for guaranteed process results
- System components to overcome effects of process build-ups and high temperatures

Online measurement of ⁰brix i.e. sucrose concentration, at every stage of the sugar manufacturing process helps in optimising the process time and energy, a consistent product quality. Forbes Marshall offers a microwave based ⁰brix analyser with antenna variations to suit different applications such as raw juice, hot juice at evaporator inlet and outlet, syrup line, batch and continuous pan, etc.

Benefits
- High accuracy measurement
- Microwave based technology
- Measurement independent of flow rate, change in particle size and distribution
- Measuring range from 0-1000 ⁰brix
- Cleaning flange with flushing facility for continuous pan applications
- Easy calibration
Juice, syrup, molasses with increasing viscosity are the various stages during sugar manufacturing. The flow rate, as well as the level in the relevant equipment such as feed tanks, evaporators, pans, storage tanks, etc., needs to be measured at every stage. Our state-of-the-art electro-magnetic flow meters, coriolis mass flow meters with density and temperature (optional – brix or concentration) accurately measure flowrates of raw water, soft water, chemicals, raw juice, hot juice, concentrated juice, syrup, molasses, etc. We also offer vortex flow meter for saturated steam and condensate flow measurements.

Our range of contact and non-contact type radar level transmitters for water tanks, juice tanks, evaporators, pan, syrup and molasses tanks and sugar silos are highly cost-effective and reliable measuring aids.

**Benefits**
- High accuracy and reliability
- Measurements not influenced by changes in particle size or viscosity
- Variety of end connections, configuration, material of construction, antennas – to suit specific application

Occasionally, the tube puncture or leakage in evaporator contaminates the condensate, making it unsuitable for use in boiler circuit. Forbes Marshall offers a complete system using conductivity sensor based contamination detection along with a 3-way pneumatically operated diverting globe valve. This ensures online detection and immediate diversion of contamination in the return condensate.

**Benefits**
- Online contamination detection and automatic diversion
- Saves load on deaerator and ensures uninterrupted steam generation
Boiling House

Level Controlled Condensate Evacuation System

Major consumption of steam in the sugar plant is in the first effect evaporator. 1.5 bar g steam is used to heat the juice to increase its concentration. Steam consumption is very high in this area during start-up after every cleaning cycle. Even in normal running conditions, the steam consumption is higher than the theoretical requirement as there is no control on condensate evacuation. A good condensate evacuation system ensures that the steam is held in the heating area till it loses all its latent heat and gets converted into condensate. The Forbes Marshall level based condensate evacuation system can reduce steam consumption by up to 4% in a controlled heating environment thereby resulting in substantial savings.

Benefits

Increased heat transfer efficiency with controlled condensate removal helps energy conservation
Reduction in steam consumption by 3 to 4%

Flash Recovery and Steam Driven Condensate Return System

The condensate from the first effect evaporator is routed through a small flash separation tank. In most plants, the flash is vented. In some, the flash line is connected to the vapour line going to the second effect. The condensate is routed through CIGAR / heat exchanger system in some plants for liquid to liquid heat transfer. The condensate is then pumped to the feed water storage tank or the deaerator, using electrically operated pumps. We often see lot of steam being vented or flashing at most of these points. Seals are leaking at these pumps, impeller maintenance is a big issue, electricity consumption is high and temperature of the condensate going to the boiler circuit is low.

The Forbes Marshall flash header with multiple steam driven condensate return pump systems, pumps the condensate back at higher temperature (close to sensible heat) directly to the deaerator. This reduces the deaerator steam consumption by 2 to 4 TPH. Further, the flash steam is fully recovered from the common header, which is totally dry. This can be either mixed with the wet vapours of the first effect making the heating in subsequent evaporators and pans more efficient due to the increased dryness. Alternatively, it can be used for juice preheating.

Benefits

Condensate is returned at a higher temperature in the deaerator, reducing deaerator steam consumption by 2 to 4 TPH
Optimum flash recovery and effective heat transfer
Maintenance free condensate pumping with saving of electrical energy consumed for condensate pumps
Boiling House

Compact Module Two Orifice Float Trap

Most of the saturated steam is utilised in the boiling house. The first body evaporator, sulphur burner, superheated wash water and air dryer utilise steam. Vapours generated in the first effect and subsequent effects of evaporator bodies are used for heating. This is basically wet steam, containing high degree of moisture. As the vapours are at low pressure and high volume, the headers carrying them are little oversized resulting in condensate formation in these headers.

Removal of condensate is essential for efficient heat transfer and prolonged life of equipment and piping, which otherwise get eroded due to hammering effect. Usually we see a 2" or 3" pipe being run down from the header directly and a drain valve or a thermodynamic trap connected at the end of this pipe, before draining. The thermodynamic trap is not capable of handling high condensate discharge flow rates, hence usually it is bypassed, thereby venting steam/vapour.

Forbes Marshall offers to study the piping layout, suggest appropriate drip leg size with drain pocket at required locations. The drain pocket installed with the Forbes Marshall compact module two orifice float trap ensures that condensate and moisture are effectively removed leading to optimum heat transfer thereby saving energy.

Benefits
High accuracy and reliability
Measurements not influenced by changes in particle size or viscosity
Variety of end connections, configuration, material of construction, antennas – to suit specific application

Thermal Energy Assessment Services

Forbes Marshall provides services that contribute towards a sustainable planet by continuously creating new benchmarks as leaders in building reliable and energy efficient utility systems for process industry by empowering people as change-agents. Towards achieving this vision our team of over 40 engineers, zealously approaches every assignment to set benchmarks in specific energy consumption and continuously better them.

Our Strengths
Over 4,000 audits and utility design consultancy of which over 200 audits and utility design consultancies across process industries
In-depth process knowledge with database of equipment and process wise findings based on our detailed benchmarking exercises across plants
Unique dual expertise of utility design and system improvement
An understanding of operational issues in running plants which are addressed in our design
Understand utility requirements of the process and design plant utilities that not only meet process requirement but also enable lowest specific energy consumption
Designed several best in specific energy consumption plants across F&B including potato based processed food, beverage, brewery, confectionery, dairy, processed food, edible oil, etc.
Most of the saturated steam is utilised in the boiling house. The first body evaporator, sulphur burner, superheated wash water and air dryer utilise steam. Vapours generated in the first effect and subsequent effects of evaporator bodies are used for heating. This is basically wet steam, containing high degree of moisture. As the vapours are at low pressure and high volume, the headers carrying them are little oversized resulting in condensate formation in these headers. Removal of condensate is essential for efficient heat transfer and prolonged life of equipment and piping, which otherwise get eroded due to hammering effect.

Usually we see a 2” or 3” pipe being run down from the header directly and a drain valve or a thermodynamic trap connected at the end of this pipe, before draining. The thermodynamic trap is not capable of handling high condensate discharge flow rates, hence usually it is bypassed, thereby venting steam/vapour.

Forbes Marshall offers to study the piping layout, suggest appropriate drip leg size with drain pocket at required locations. The drain pocket installed with the Forbes Marshall compact module two orifice float trap ensures that condensate and moisture are effectively removed leading to optimum heat transfer thereby saving energy.

**Benefits**
- High accuracy and reliability
- Measurements not influenced by changes in particle size or viscosity
- Variety of end connections, configuration, material of construction, antennas – to suit specific application

Forbes Marshall provides services that contribute towards a sustainable planet by continuously creating new benchmarks as leaders in building reliable and energy efficient utility systems for process industry by empowering people as change-agents. Towards achieving this vision our team of over 40 engineers, zealously approaches every assignment to set benchmarks in specific energy consumption and continuously better them.

**Our Strengths**
- Over 4,000 audits and utility design consultancy of which over 200 audits and utility design consultancies across process industries
- In-depth process knowledge with database of equipment and process wise findings based on our detailed benchmarking exercises
- Unique dual expertise of utility design and system improvement
- An understanding of operational issues in running plants which are addressed in our design
- Understand utility requirements of the process and design plant utilities that not only meet process requirement but also enable lowest specific energy consumption
- Designed several best in specific energy consumption plants across F&B including potato based processed food, beverage, brewery, confectionery, dairy, processed food, edible oil, etc.

**Thermal Energy Assessment Services**

**Compact Module Two Orifice Float Trap**

**Distillery**

**Distillery Automation**

Specialised instrumentation packages for molasses fermentation control systems including molasses sterilisation, temperature control, pH control, anti-foam control, etc.

Specialised instrumentation packages for distillation columns in alcohol industry to provide substantial savings on steam, consistency in alcohol quality

Instrumentation and control for biogas generation plants

**Benefits**
- Higher throughput
- Consistent product quality
- Savings on utility cost
- Safety
- User flexibility

**Coriolis Mass Flowmeter**

Apart from power boiler systems and accessories, we offer coriolis mass flowmeter with temperature and brix measurement which is crucial for deriving the efficiency of spent wash fired boilers.

**Control Valves**

In the distillery process, water, steam, air, raw feed stocks and intermediate stage liquids need to be controlled at various stages. For precision control of the pressure, temperature, flow and level of these fluids, depending on the applications, we offer pneumatic globe control valve
Dispensing the alcohol/ethanol into tankers is a task. Traditional PD meter based systems are manual and have a lot of limitations and maintenance issues.

Forbes Marshall offers a complete skid mounted system with mass flow meter, batcher-cum-controller, digital control valve and accessories. PC based ticket printing, invoice generation, data logging and interface with central control system are the other features. Safety interlocks like earthing protection, overfill protection, authentication, emergency start-stop are embedded. The system ensures all transactions at standard volume, with required conversions.

**Benefits**

- Ensure quick and accurate transfer with zero loss
- Increased safety
- Reduced error
- Automated report generation
**Steam Operated Pump Trap**

Forbes Marshall recommends for correct drip-leg size and location, type and size of trap for steam lines based on a detailed survey and study of the plant.

In some applications, the condensate stalls in the trap, due to back-pressure. For such applications, to evacuate the condensate, we recommend the installation of a steam operated pump trap for effective removal of condensate, using steam as motive to push it further.

**Benefits**
- Effective condensate removal in case of stalled condition
- Transfer of condensate without use of additional energy

---

**Flash Steam and Condensate Recovery**

The distillery of a sugar plant is located away from the sugar / cogen boiler and is a separate unit. Condensate from the first effect evaporator condensate is poorly handled and, in many plants, not returned to the deaerator. Even when it is returned, the electrical energy consumed is high and the return condensate temperatures are low.

The Forbes Marshall pressure powered pump packaged unit driven by steam/ air keeps energy requirements to the minimum. This unit has flash separation with steam driven condensate return pump. The condensate is pumped back at 105°C directly to the deaerator. This reduces the deaerator steam consumption. The flash steam is recovered from the header of this pump, which is totally dry. It can be either mixed with the wet vapours of the first effect, to have dry vapour in the vapour line, making the heating in subsequent evaporators more efficient due to the increased dryness. Alternatively, it can be used for preheating.

**Benefits**
- Condensate is returned at higher temperature in deaerator, reducing deaerator steam consumption
- Flash recovery and effective heat transfer
- Maintenance free condensate pumping with saving of electrical energy consumed for condensate pumps
Handling the wastewater output from a process industry, treating it before disposal and meeting stringent pollution board norms has always been a tedious task. Therefore, it becomes very essential to run the effluent treatment plant effectively to achieve the desired results as well as optimise the process so that the cost of operation is minimal.

**The Forbes Marshall Solution**

Complete automation packages for ETPs to ensure precise online monitoring of the effluent and control the treated water quality with energy efficient solutions.

AquaMax, an energy efficient DO based aeration control system that monitors and controls the dissolved oxygen levels with optimised operation of the aerator. It also helps reduce electricity bills as a direct benefit with a defined ROI period.

pH Monitoring and dosing system for the neutralisation pit of an ETP to control treated water quality

Flow monitoring of effluent at inlet and outlet of the ETP to keep a track of the incoming loads and outlet quantity

Multiparameter analysers for measurement of COD/BOD/pH/TSS for compliance to comply the PCB norms

**Benefits**

Direct electrical energy savings in terms of reduced bills

Stabilized DO/COD and BOD levels

Maintenance free sensors for continuous monitoring

Reduced operational cost of ETP

Automated recording and reporting
Flue gases from boiler are exhausted from the stack. These gases contain SOx, NOx, CO, CO2, dust, etc. To know and calculate the total emission, velocity and flow metering is also essential.

For boiler efficiency, one needs to know the concentration of gases passing through the stack. Further, pollution control boards have issued the directives for mandatory online monitoring of the stack parameters, for environmental protection. Similarly, the ETP treated water flow and quality (pH, BOD, COD and TSS) needs to be monitored.

For distilleries with evaporation ponds, the spent wash flow and density at the distillery outlet and pond receipt point need to be monitored and displayed. The cameras need to be connected via web for remote monitoring. For distillery with zero liquid discharge, also, the flow meters and cameras must be provided.

**Forbes Marshall Solution**

Forbes Marshall offers a complete solution with reliable measuring instruments in the field with latest technologies, their inter-connectivity for online data transmission with necessary accessories and software. We support these systems with an annual maintenance contract, spares and services, for this long term requirement.

**Benefits**

- No sampling, heating or conditioning of flue gases required
- Seamless data transfer to CPCB / SPCB server
- Low power consumption
- Continuous data availability
Seven Decades of Process Solutions
We have created an efficient business by integrating our knowledge, services and technology to provide smarter solutions. Our installed base stands testimony to this.

<table>
<thead>
<tr>
<th>Product Line</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam Traps</td>
<td>30,000+</td>
</tr>
<tr>
<td>PRDS, DSH and Attemperators</td>
<td>4,000+</td>
</tr>
<tr>
<td>Control Valves</td>
<td>80,000</td>
</tr>
<tr>
<td>Control Systems &amp; Automation Packages</td>
<td>500+</td>
</tr>
<tr>
<td>Flowmeters</td>
<td>7800</td>
</tr>
<tr>
<td>Online Monitoring Systems</td>
<td>450+</td>
</tr>
<tr>
<td>Vibration Monitoring Systems</td>
<td>500</td>
</tr>
<tr>
<td>Process Analysers</td>
<td>11250</td>
</tr>
<tr>
<td>Gauges</td>
<td>18000</td>
</tr>
<tr>
<td>Dust and Gas Monitoring Systems</td>
<td>500</td>
</tr>
<tr>
<td>Steam and Water Analysis</td>
<td>75</td>
</tr>
<tr>
<td>Alcohol Dispensing Systems</td>
<td>100+</td>
</tr>
</tbody>
</table>

Write to us at coremktg@forbesmarshall.com or scan the QR code