



## Steam and Water Analysis System

“One Stop Solution  
for Analysers and  
Sampling Systems  
in Liquid, Gas and  
Ambient Air”

Rich Experience in Power Plants  
15 MW to 800 MW



Analysis | Monitoring | Performance

## Company Profile



Steam Equipments Pvt. Ltd. is involved in manufacturing, designing, distribution and development of high quality and precise analytical instrumentation, Sample Handling System and Shelter Houses. Operating from headquarters in Pune, India, the company has established its sales and service operation in 40 countries. The company is dedicated to produce high quality instrumentation package backed by its world class 24 X 7 customer service.

Steam Equipments manufactures all products in development of its Steam and Water Analysis System, CEMS, AAQMS, Process gas analyzer systems and other associated accessories.

## Products

- Steam and Water Analysis System (SWAS)
- Process Gas and Liquid Analysers
- Sampling Systems and Walk-in Shelters
- Continuous Emission Monitoring Systems (CEMS)
- Pressure Reducing & Desuper heating Stations (PRDS)
- Ambient Air Quality Monitoring Systems (AAQMS)
- Steam Accesories: Steam Trap, Steam Valves, strainer, Temp/Pressure/Control System.

## Our Vision

Steam Equipments will strive to be a World Class supplier of Gas and liquid Analytical Systems. We will achieve this through :

- Innovation in the products we manufacture and distribute.
- Investment in our people.
- Achieving customer satisfaction.
- Maintaining world-class product quality.
- Shipping products that meet or exceed customer's expectations for performance and deliver.

## Quality Policy

SEPL is dedicated for commitment in improving the quality of products and satisfaction of customers through:

- Products that consistently meet or exceed expectations on performance, reliability, and durability.
- Service to customers that is prompt and courteous.
- Deliveries on time.
- Involvement and accountability of entire management team.

Our employees pledge to meet this through a quality process based upon a solid foundation of ethical principles, conscientious attention, detail and proven product engineering and state of art manufacturing practices.



## INDUSTRIES SERVED

- Power Generation
- Petrochemical
- Refineries
- Nuclear
- Waste Water Treatment
- Chemical Industries
- Food & Beverage
- Steel
- Pulp & Paper
- Cement

Products Offered by  
Steam Equipments in  
Power Industries



**Steam & Water  
Analysis System**



**In-Situ CEMS**



**AAQMS**



**Water Quality  
Analyzers**



**EQMS  
Systems**



**Degassed Conductivity  
Analyzer**



**Zirconia  
Analyzer**



**Opacity (PM)  
Monitor**



**Dewpoint  
Transmitter**



**Chiller**



**Portable Emissions  
Analyzer**



**Steam Traps, Valves,  
Strainers etc.**

## Steam and Water Analysis System (SWAS)



Monitoring purity of boiler water and steam is very important. Failing to accomplish this may lead to major break down/shut-down of the power plant. A major goal of plant chemical control is to prevent the solids build up and corrosion in the plant. The water used in power plant threatens the integrity of the plant equipment such as steam turbine, boiler, condensers, heater, pump and other apparatus. These equipments are under constant attack from erosive and corrosive element such as Silica, Sodium, Chlorides, Calcium, Dissolved Oxygen etc. Without accurate monitoring of water chemistry, the plant may suffer heavy mechanical damages, reduced efficiency/deposition on the turbine blades and corrosion of pipe line.

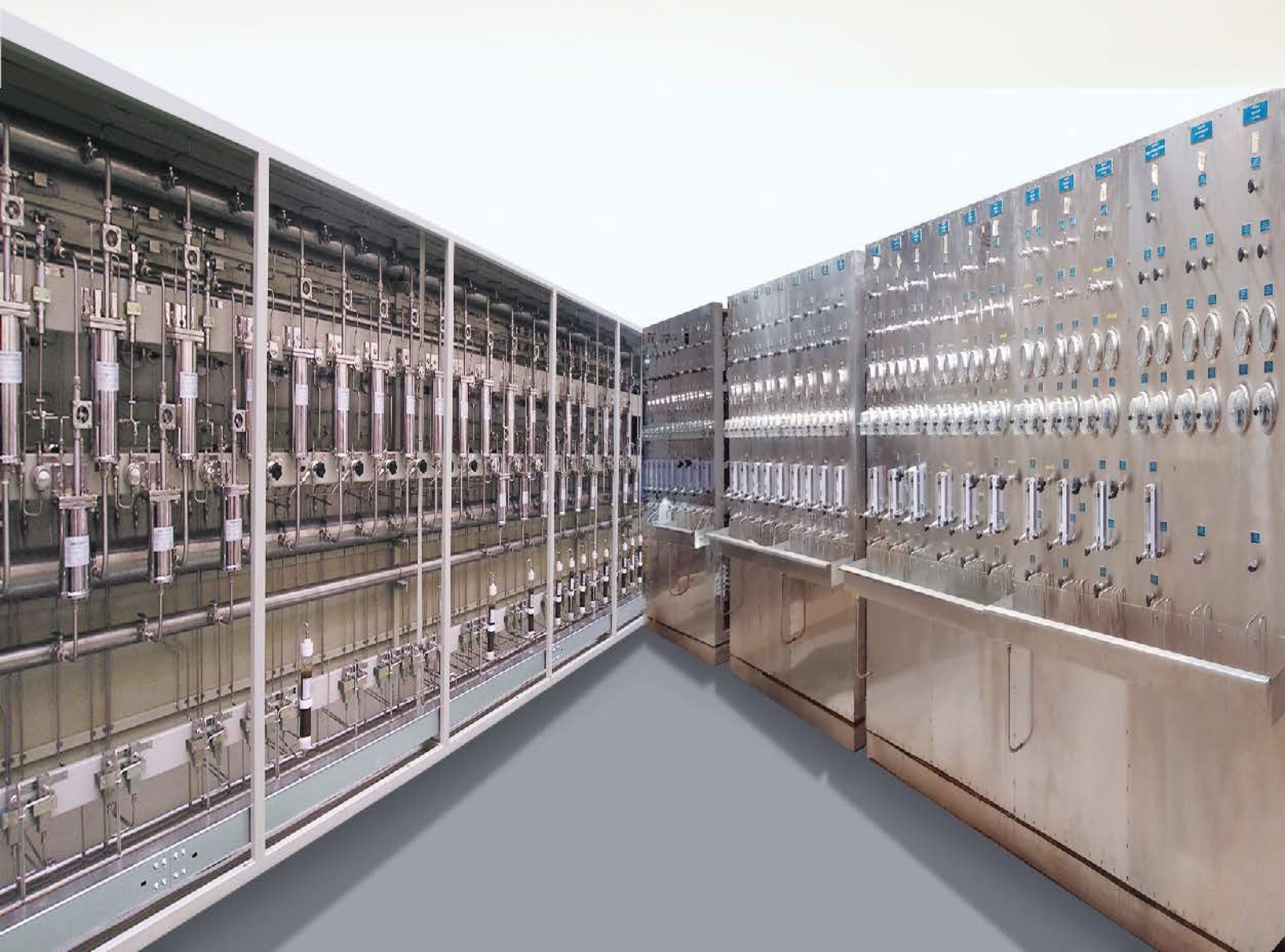
To keep the power plant healthy and running with minimum corrosion and scaling, on - line monitoring of Steam and Water Quality is mandatory. The temperature and pressure of steam used for power generation is around 650°C & 325 Bar. Most of the analyzers used in the steam and water analysis system (SWAS) cannot withstand such a high temperature & pressure. We have designed and developed Steam and

water analysis system (SWAS) in accordance with the recommendations of ASME PTC 19.11 Part-II, water & steam in power cycle.

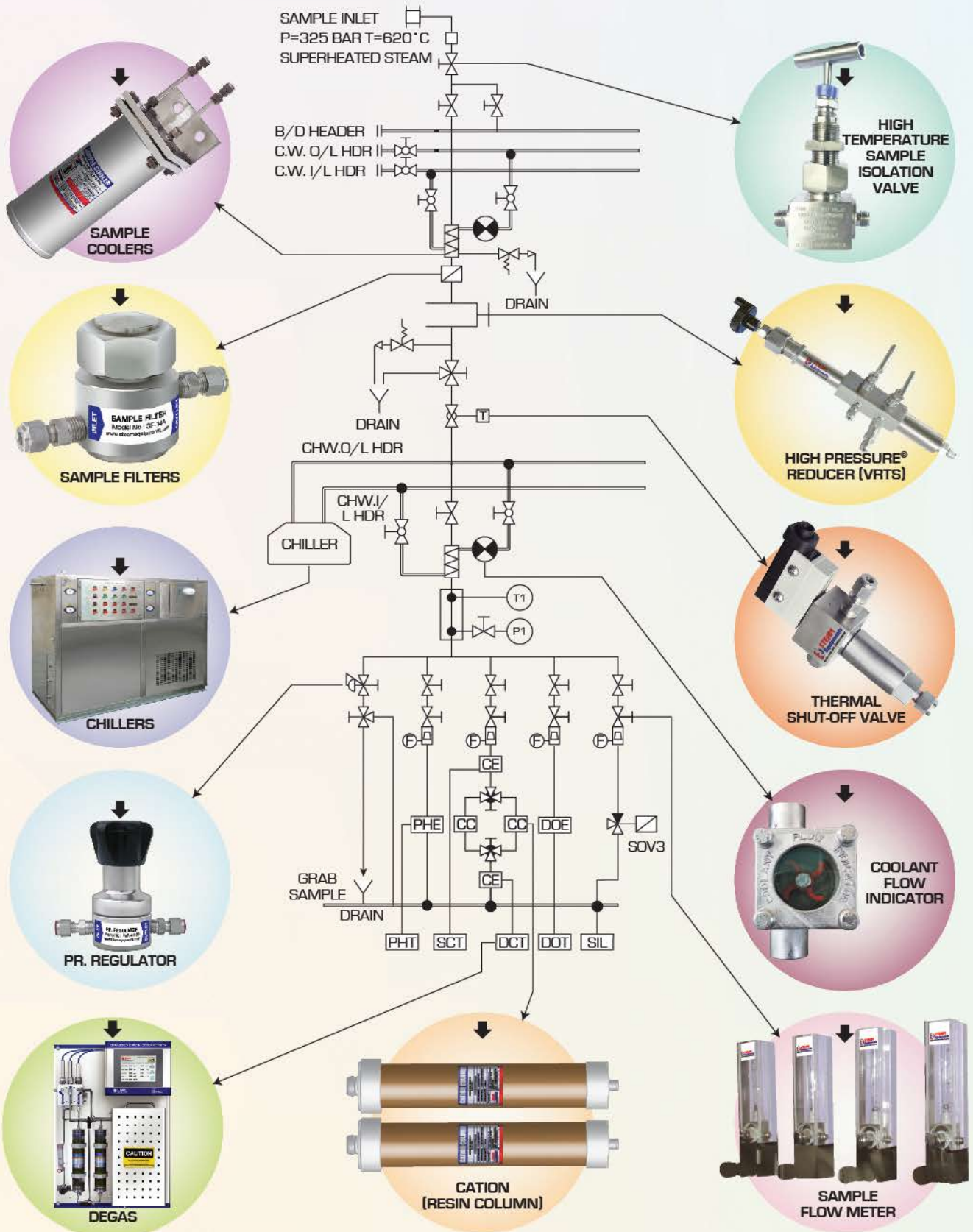
The SWAS panel and shall comprise of Sample Conditioning panel and Analyzer Panel (Dry Sections) shall house cells, all analyzers, monitors, recorders etc.

**Wet Panel:** these panels are generally designed for wet conditions having no electrical components and house sample coolers, pressure reducing elements, high temperature thermal shut-off valves, back pressure regulators, pressure & temperature gauges, flow indicators as shown in the typical drawing. In this system, the sample is cooled and depressurized using sample coolers, pressure reducers and other safety, flow controls. indicating devices are installed in this system.

The construction is designed as per customer requirements like open frame free standing design, fully enclosed walk-through type design, skid mounted design, wet and dry panel housed together. We take utmost care for proper layout, easy to maintain and proper selection of materials.



# Typical P & I Drawing



## Sampling System Components

### Sample Cooler

Sample Coolers are used to reduce the temperature from 650 °C to 45 °C.

#### Features :

- Design Temp : 650 °C & Pressure : 400 Bar
- Very Close Approach Temp
- Sample cooler coils with 100% traceability with MTC
- Truly Counter - flow design
- Compact Design
- On - Line shell cleaning
- Built - in Safety Valve for CW line
- 3 stage cooling in one shell design
- Fully Stainless Steel material
- Removable Coil & shell, No Welded Joints
- Suitable for SWAS & Gas applications
- More than 7000 coolers installed worldwide.
- SS-316 / Inconel - 625.



### High Pressure Reducer (Vrts)

VRTS is used to reduce the sample pressure from 400 bar to 3 bar

#### Features :

- Rob - in Tube Pressure Reducer
- Designed for High Pressure 400 Bar, Temperature : 650 °C
- Outlet pressure 0 to 30 Bar Adjustable
- Built - in Thermal Shut - off valve.
- Built - in Pressure relief valve.
- Built - in Temp contacts
- On line grab sample valve
- On line blow down valve
- No Filters Required
- 6 components in one assembly
- Maintenance free with online clearing arrangement.tt



### Back Pressure Regulator

Back Pressure Regulators are used for uninterrupted, regulated flow at constant pressure to analyzer. These regulators are generally used at outlet of Grab Sample.

#### Features :

- Set Pressure : 3 Bar, Temperature = 120 °C (Max)
- Very Compact design
- Stainless Steel Diaphragm
- Fully Stainless Steel Construction
- 1/4" OD/3/8" OD end connections.



## Sampling System Components

### High Temperature Sample Shut - Off Valve

The high temperature thermal shut - off valve is used to protect the analyzer sensor during failure of cooling water supply to sample cooler. This equipment is replacement for typical electrical circuit consisting of temperature switch, solenoid valve, junction box and other associated wiring.

#### Features :

- Automatic Reset : No Operator involvement required.
- No outside Power Source required.
- Reliable Shut - off : Ram - type plug design.
- Operating temperatures unaffected by pressure.
- Wide Choice of Set points.
- Operates in any orientation.
- Maintenance less.
- Easy to install and long life.



### Sample Filter

High Pressure sample filter is used to trap the Particles upto 40 Micron and prevent choking of the sampling lines.

#### Features :

- Design pressure 400 Bar, temperature 650 °C
- 40 Micron Sintered Stainless Steel filter element
- Compact Design
- Spring Loaded, Easy to clean
- Stainless steel body material

### Cation (Resin) Column

Cation Columns are filled with H<sup>+</sup> ions and used to measure cation conductivity.

#### Features :

- Slim Design for better performance.
- Color indicating type of resin.
- Optional quick - disconnecting kit.
- Designed for Max Pressure upto 10 Bar
- Design Temperature : 80 °C
- Easy replacement of resin.
- More than 3000 Cation Columns installed worldwide.



## SAMPLING SYSTEM

### Lab Sampling Module

This plate mounted sampling system occupies very less space & is easy to install.

- Designed as per ASME PTC 19.11 Recommendations.
- Pre-Engineered, Ready to Install
- Compact Sample Conditioning Module
- Suitable for Stand-Alone pH/Cond/DO Analyzers
- Design Temp : 650 °C & Pressure : 400 Bar
- Single Sample Cooler
- Compact double helix type, shell & tube sample coolers.
- No Power Supply required. No wiring.
- Easy access to components.



### Rack and Plate Mounted pH/Cond/DO Analyzers



### Walkway Type Systems

#### Quick Overview

Walk in type sample conditioning systems are best suited for mid-size and large plants. These are safe for use, provide separate interface for user & system expert, thus protecting the equipment from unauthorised usage/fiddling. The deliveries of such systems can be given in a medium span.

#### Features

- Closed type construction
- Separate interface for operator
- Easy access for operator to all essential indicating instruments
- Design provides safety to the equipment ensuring longevity and trouble-free operation.





## SAMPLING SYSTEM

### Combined System



#### Quick Overview:

It consists of both wet panel and dry panel combined into one system. It is customer built panel which includes Primary and Secondary sampling components in one skid with indicating and control instruments like Isolation Valves, Blow Down Valves, Pressure Regulator, Pressure Gauge, Temperature Gauge, Rotameter, Grab Sample Valves are in front of the panel mounted on SS sheet with common Tundish. Wet panel components such as Sample Cooler, Filter, Cooling and Chilled Water Isolation Valves, Thermal Shut Off Valve, BPRV, Cation Column etc. are on the back of the panel. Flush mounted analyzer panel is adjacent to sample panel which makes combined panel compact and easily serviceable.

### Open Frame Free Standing Racks

#### Quick Overview:

Open frame free standing racks are best suited for smaller plants. These are easy to assemble, commission & use. The deliveries of such systems can be given in a short span.



#### Applications:

- Captive Power Plants
- Co-generations Plants
- Combined Cycle Power Plants
- Chemical/Petrochemical/Fertilizer/Refinery applications of sample conditioning and analysis.



## Shelters (Containerised Systems)

### Quick Overview:

Shelters (or some call it Containerised systems) are the best suited for large plants. These are safe for use, provide good working area for user & system expert, yet protects the equipment from unauthorised usage / fiddling. Shelters save space, civil work, field work & lot of time on site, as these are plug and play type systems. The deliveries of such systems can be given in a medium span.

### Features:

- Totally enclosed construction
- Analysers and Sampling system at one place
- Easy access for operator to all instruments
- Design provides safety to the equipment ensuring longevity and trouble-free operation
- Can be installed and commissioned in record time

### Benefits:

- Longer life of equipment ensured.
- High degree of safety to the operator ensured.
- Unauthorised usage totally prevented.
- Saves lot of time at site in terms of installation as well as commissioning.
- Saves lot of civil work, tubing, piping and cabling.
- Plug and play construction.
- Saving in manpower and material costs at site, thus reducing project costing substantially.
- Saving in utilities transport.



## Degassed Cation Conductivity

A new design for conductivity measurement for power cycle chemistry monitoring. By providing conductivity measurement, in compliance with ASTM D4519, this system provides assurance of water purity to maximize power production and minimize corrosion. Unambiguous measurement of trace levels of corrosion causing contaminants is enabled with effective operator supervision. A must product for startup and supercritical Boilers.

### Features :

- All conductivity measurements
- No External Cooling Water Required
- Dual Redundant Columns
- Stainless Steel Construction
- Multi-parameter transmitter with single-screen display of all measurements
- Very High Accuracy
- Auto Ranging
- Integrated flow sensor with automatic heater shut-off if flow stops
- Precise detection of corrosive contaminants
- Inferred pH and CO<sub>2</sub>
- Trend Graphs for all measurements
- Universal PCB
- Digital Sensors
- Emergency Stop Button
- Low Flow Cutoff

### Benefits

- Faster Plant Startups and simpler turbine warranty compliance
- Easy displaying and monitoring of sample conditions
- Protects the system from thermal damage and maintenance
- Understand plant characteristics better and plan maintenance, avoiding plant shutdowns
- Colour Indicating Resin for depletion
- Alert for changeover of Cation Column

### Applications

- Feed Water and Steam Monitoring
- Power Plant Steam Quality Monitoring
- Power Plant Condensate Monitoring



## Water Chiller

These Chillers are available in various combination



SEPL's chiller is designed with sufficient refrigeration capacity to ensure that sample stream temperature is up to  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . It is fabricated with complete stainless-steel construction. Chiller is in accordance with the ASME code. Refrigerant circuit consists of components such as thermostatic expansion valve, liquid line solenoid valve, sight glasses, filter-dryer, refrigerant shut-off and charging valves.

### Features :

- Isothermal Bath type, Water/Air cooled type.
- Compact Design.
- Stand by Compressor & Pumps.
- Sample Coils of Stainless steel.
- Stainless steel Tank.
- Available upto 10 Tons capacity.
- Hermetically Sealed Compressor.
- Chillers are fully automatic with tried & tested controls.
- Truly 2x100% construction suitable (1W+1S).
- Wide range - 0.3 TR to 30 TR capacity
- Automatic switch over-Optional
- Energy Efficient design with VFD control- Optional
- Environment Friendly refrigerant Internationally available makes of components. Water Cooled and Air-Coaled Condenser Complete Stainless-Steel Construction- Optional
- Models for Hazardous area application - Optional.

- Evaporator - Shell & tube and Plate Heat Exchanger (PHE) type as per choice.
- Isothermal bath design - available on request
- Truly sample outlet temperature off  $0.5^{\circ}\text{C}$ .
- Refrigerants - 134a, R407C, R22

### Applications:

In sample handling systems, chillers are used to achieve outlet temperature of sample at  $25^{\circ}\text{C}$ . Chiller package is one of the important & valuable element of SWAS Unit.

## Closed Circuit Water Circulation System

### Features :

- 100% Stand - by Pump, Motor & Heat Exchangers.
- Auto - Change Over Facility.
- Fully Stainless Steel Construction.
- Capacity : Upto 120kw.
- Easy to Maintain.



**Zirconia Based Oxygen Analyser with heated & non heated probes and auto calibration**

9090 O. analyzer / transmitter provides in - situ analysis capability which can accept signals from up to two zirconia probes for averaging or backup purposes in furnaces, kilns

and boilers with sample temperatures ranging from ambient upto 1400 °C. This unit is provided with a compact, steel, NEMA - 4 easily installed, gasketed enclosure suitable for wall mounting. Purged or explosion proof design enclosures for hazardous areas can also be supplied.



**ESSAR POWER**

Chief Engineer  
Major Thermal Power Station I  
BANDRACHOLI, Dist. Coimbatore, Tamil Nadu - 646 406

March 9, 2007

**Performance Letter**  
To whomsoever it may concern

Name of Instrument: Steam & Water Analyser System Components  
Model: Steam Equipments, Pune, India

This is to certify that I wear Equipments Pvt. Ltd., Pune make Rank 1 Ultra High Pressure Regulator and Rank 1 Ultra High Pressure Regulator supplied for use GMP INTERNATIONAL S&P's wetting solubility at our plant from India after and commissioning. The details are as follows:

SWAS Composed Description	Model	Qty	App.	Commissioned in the year
Pressure Regulator Rank 1 Ultra High Pressure	RE-111-4	28	2007	
Rank 1 Ultra High Pressure Regulator	R112-4	28	2007	

We are pleased with the satisfactory service provided by M/S GMP INTERNATIONAL S&P, B-17/08, Rajiv Apartment, Near Conco World Metro, K. J. Somaiya Chowdhanbhai Road, S. P. - 485 014.

For, Essar Power Limited  
*S. D. Joshi*  
Chief Engineer  
(I.C.M.)

**M. V. JAYAPAL, B.E.**  
Chief Engineer  
Major Thermal Power Station I  
BANDRACHOLI, Dist. Coimbatore, Tamil Nadu - 646 406

Phone: 0426-281129  
Fax: 0426-240311  
E-Mail: comp@vsnl.com

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For, Essar Power Limited  
*S. D. Joshi*  
Chief Engineer  
(I.C.M.)

**MAHA ENGINEERING PRIVATE LIMITED**

Chief Engineer  
Major Thermal Power Station I  
BANDRACHOLI, Dist. Coimbatore, Tamil Nadu - 646 406

Phone: 0426-281129  
Fax: 0426-240311  
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For, Essar Power Limited  
*S. D. Joshi*  
Chief Engineer  
(I.C.M.)

**JSW Energy Limited**

Chief Engineer  
Major Thermal Power Station I  
BANDRACHOLI, Dist. Coimbatore, Tamil Nadu - 646 406

Phone: 0426-281129  
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For, Maha Engineering Private Limited  
*S. D. Joshi*  
Chief Engineer  
(I.C.M.)

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**SWAS • CEMS • AAQMS • SHELTERS • ANALYZERS • EQMS • WQMS • CHILLERS  
STEAM TRAPS • BALL FLOAT TRAP • PISTON VALVES • STRAINERS • PRDSH**



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Sudan	Uganda	South Africa	Nigeria	Australia
	Canada	Mexico	USA	



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