

Product Brochure

Steam

Systems

Division

The products you see in this overview are only a part of what Forbes Marshall does.

That's because we do much more than sell products. We

offer our customers a comprehensive range of

services, products and

solutions for utilities and

process control. Our

knowledge, innovative

solutions, reliable products

and global presence make us

a trusted partner.

Forbes Marshall Solutions

High efficiency packaged boilers, burners and boiler monitoring systems, thermocompressor systems, process analysers and control systems, vibration monitoring systems, turnkey solutions for process industries, steam, water and gas analysis solutions, distributed control systems, smart transmitters, controllers and transducers, automation packages energy audits and project consultancy.

Forbes Marshall Arca

Control valves, actuators, positioners, and pressure reducing desuperheating stations.

Forbes Marshall Codel

Emission monitoring systems.

Krohne Marshall

Advanced flowmetering and level control.

Forbes Marshall Steam Systems

Steam systems, trapping, valves and controls, steam flowmetering, automatic boiler controls.

Forbes Vyncke

Biomass solid fuel fired boilers.

Introduction

Forbes Marshall is a leading manufacturer of steam engineering and control instrumentation solutions. Our products and services help our customers save energy, improve process quality and throughput, and run a clean and safe factory.

Our long and deep customer relationships, over 70 years, enable development of unique and innovative products and services that solve real problems. Over 700 engineers located in five continents take us to market through a technical direct-sales approach of daily contact with customers from core and process industry. We value each of our industrial customers, from a regional food-processor or garment factory, the world's leading manufacturers of consumer products to the world's largest refineries.

We deliver from five benchmark manufacturing facilities in India including one in the UK. We have also partnered with technology leaders and pioneers in Belgium, Germany and Japan. Our R&D efforts have resulted in several award winning products that are appreciated by customers.

We take great pride in our family of 1500+ members. We have been listed several times among the top "Best Workplaces in India", and first in the manufacturing industry by surveys conducted by the Great Place to Work Institute in association with Economic Times. We have also been ranked 11th Best Workplace in Asia, and are the highest ranked true engineering company.

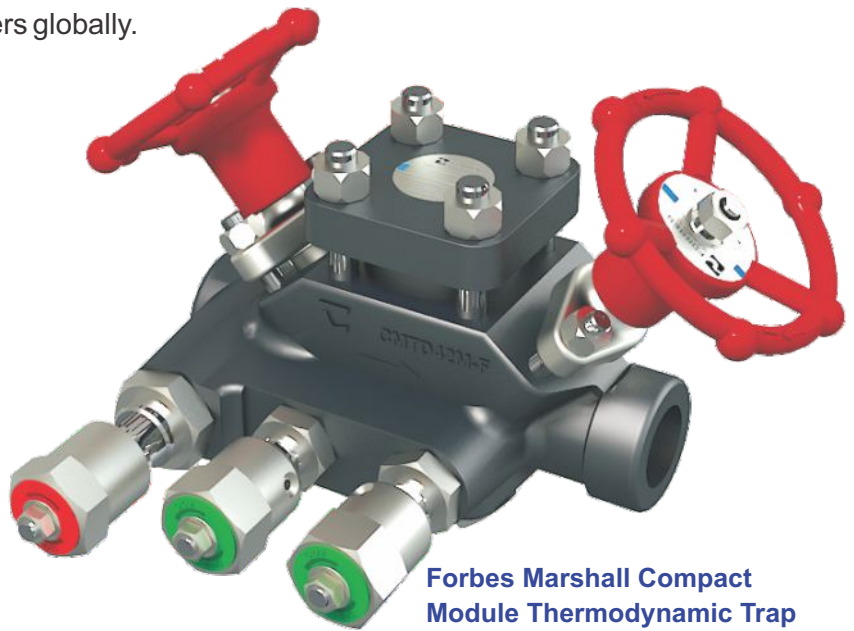
Every kind of Trap, Everything in Trapping.

We manufacture steam traps for every application in all types, sizes and materials. We are one of the largest trap manufacturers globally.



**Forbes Marshall
Thermodynamic Trap
(FMTD)**

The Forbes Marshall Thermodynamic trap with inbuilt strainer and full stainless steel construction, is best suited for header and mainline drains.



**Forbes Marshall Compact
Module Thermodynamic Trap
(CMTD)**

Steam Operated Pump Trap (SOPT)

Steam operated pumping trap with flanged connections. Capable of working in trapping or pumping mode automatically, depending on the process conditions. The unit is operated by steam/air & is used to remove condensate under all operating conditions including vacuum / stall conditions.



Compact thermodynamic trap module designed with an inbuilt bypass valve, trap vent valve & trap test valve. Replaceable trap internals and inbuilt strainer eases online maintenance.



Two Orifice Float Trap (TOFT)

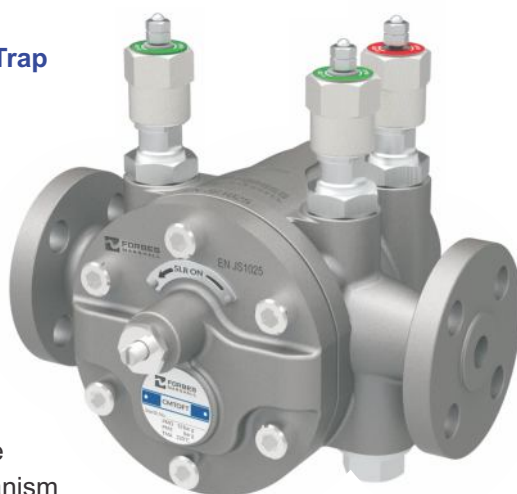
Two Orifice Float Trap, has an SG iron cover and base with stainless steel internals and optional automatic air venting and steam lock release facility.

The TOFT comes with two orifices operated by single float. For normal running condensate load single orifice opens and with increase in condensate load opens the second orifice. This modulating mechanism enables the trap to efficiently cope with the condensate load at start-up, normal running and peak load conditions. TOFT is provided with automatic air venting, steam lock release and strainer.

Compact Module Two Orifice Float Trap (CMTOFT)

Two Orifice Float Trap, has SG iron cover and base with stainless steel internals and integral automatic air venting facility.

The CMTOFT is provided with two orifices operated by single float. For normal running condensate load single orifice opens and with increase in condensate load opens the second orifice. This modulating mechanism makes this trap to cope up efficiently the condensate load at startup, normal running and peak load conditions. CMTOFT is provided with other inbuilt features - upstream and downstream isolation valves, bypass valve, non-return valve, automatic air venting, steam lock release and strainer.



Single Orifice Float Trap (SOFT)

The single orifice float trap is available with an integral automatic air venting. A manual needle valve can be added and used as steam lock release

Forbes Marshall Tracer Line Trap (FMTLT/FMAV)

Can be used for air venting application from steam mainlines or as a steam trap for tracer line application for removal of sub cooled condensate. It comes with an inbuilt flat strainer screen.



Forbes Marshall Bucket Trap (FMBT)

Inverted bucket steam trap designed to be fitted into horizontal pipelines. Maintainable in-line and complete with integral strainer screen.



Forbes Marshall Bimetallic Trap (FMBM)

Bimetallic steam traps are designed for draining high pressure, high temperature steam lines. Specially designed for HP steam, these have a reinforced stainless steel insert within the body and can be repaired inline. They operate with no loss of steam, and quickly drain air, non-condensable gases and large quantities of cold water on start-up. Normally open in the event of failure, they have a check valve, a built-in strainer screen and an external adjustment for adjusting the discharge temperature of the condensate.



Valves to Condition and Control

Failure of a single valve can lead to a shut down, and this becomes an expensive liability. From extreme temperatures and pressures to precision control applications, our range of valves are the most dependable assets on your process line.

Pilot Operated Pressure Reducing Valves (FMPRV)

Pilot Operated Pressure Reducing Valve is a SG iron / carbon steel pressure reducing valve (pilot operated) suitable for steam or compressed air applications. Available in threaded and flanged designs



Piston Valve (PSVAL)

Ideal for use on saturated and superheated steam, heat transfer fluids, water and compressed air. Roller burnished piston and iron reinforced graphite seals provide 100% tight shut off at high temperatures as well.



Forbes Marshall Piston Actuated Valve (FMPAV)

2-port pneumatically actuated on/off stainless steel valve for use on steam, water, air, oil and gases. A pneumatic signal acts on the actuator piston to open or close the valve with a spring return action. The valve plug has a PTFE soft seal to provide a tight shut off.





Control Valve

Provides excellent performance on steam, liquid and gas applications. Modular in design and field reversible pneumatic diaphragm actuators. Suitable for severe duty applications which encounter high velocity, cavitation and noise. Can be fitted with tubeless positioners.

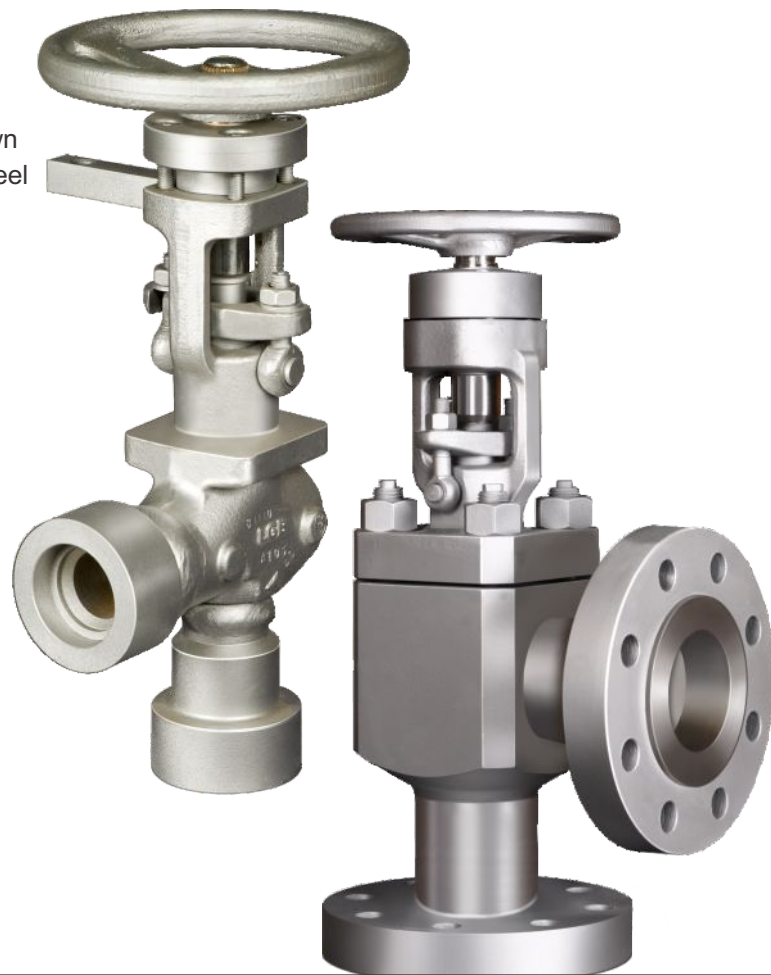


eValv™

Cage retained single seat 2 port globe control valve with multiple spring pneumatic diaphragm actuator and positioner. Characterised trims suitable for all temperature control applications.

Single Stage / Multi Stage Valves

Ideal for use in boiler drum for continuous and intermittent blowdown lines. Design available with handwheel or actuator.



Double Seated Pressure Reducing Valve (DSPRV)

The Forbes Marshall Double Seated Pressure Reducing Valve, DSPRV41 (patent pending) is a SG iron pilot operated pressure reducing valve designed for steam applications with improved turndown.





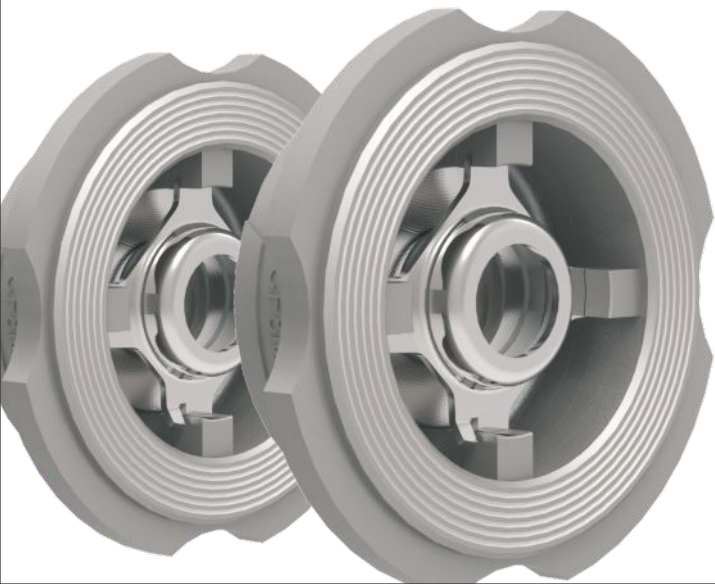
Forbes Marshall Safety Relief Valve (FMSRV)

High lift safety valve suitable for use on steam, air and water



Valve with Pressure Controller

FM Control valve with pressure controller senses upstream or downstream pressure through an impulse tubing and controls downstream/upstream pressure without having the need for elaborate pressure control loop consisting of positioner, Pressure/Position transmitter and controller. Can be used for steam, oil and gas



Forbes Marshall Disc Check Valve (FMDCV)

Wafer design sandwiched between flanges. Stainless steel construction and suitable for use on hot water systems, steam and condensate system etc

Pipeline Accessories

A wide range of steam products for the steam distribution network to ensure that your process receives steam at the optimum temperature, pressure and quality.



**Strainer
(FMSTR)**

Forbes
Marshall strainers
are available in cast iron
and carbon steel construction with
threaded / flanged ends



**Moisture
Separator
(FMSEP)**

Cast Iron or
carbon steel
baffle type separator used for the removal of
entrained liquids in steam, so that they can be drained
away as condensate. Improves efficiency of
downstream equipment such as control valves and
pressure regulators.

Pipeline Connectors (FMPC)

Pipeline connectors for multiple
connections



View Glass (FMVU)

The Forbes Marshall View
Glass allows the operator
a visual check of the
flow of steam, water or
oil inside a pipeline



Recovering Heat Maximising Efficiency

Recovering energy in condensate and flash steam enhances the steam system efficiency significantly. Forbes Marshall products for condensate and flash steam recovery help achieve best efficiency at lowest operating cost.

Duplex Pressure Powered Pump Package Unit (PPPPU-D)

Duplex Pressure Powered Pump Package Unit, is a duplex positive displacement pump unit operated by steam, compressed air or pressurized gas.



Compact Pressure Powered Pump Package Unit (PPPPU-C)

Compact positive displacement pump unit operated by steam, compressed air or pressurised gas. In-built receiver for condensate, which eliminates the construction enables this pump to be used with individual equipment also. The pump is specifically designed to pump hot condensate



High Capacity High Back Pressure Powered Pump Package Unit

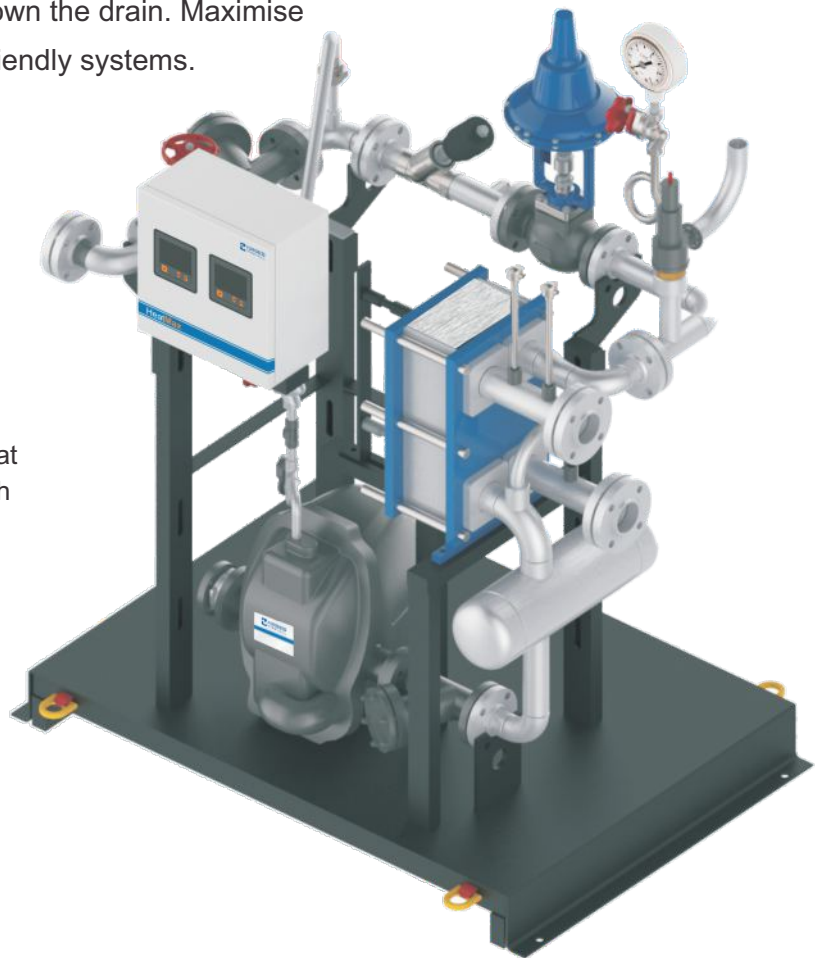


Systems to **Maximise** **Process** efficiency

Maximising energy efficiency is of prime concern across Industry. Every bit of improperly utilised fuel is a cost wasted, profit gone down the drain. Maximise efficiency with these economical, accurate and user friendly systems.

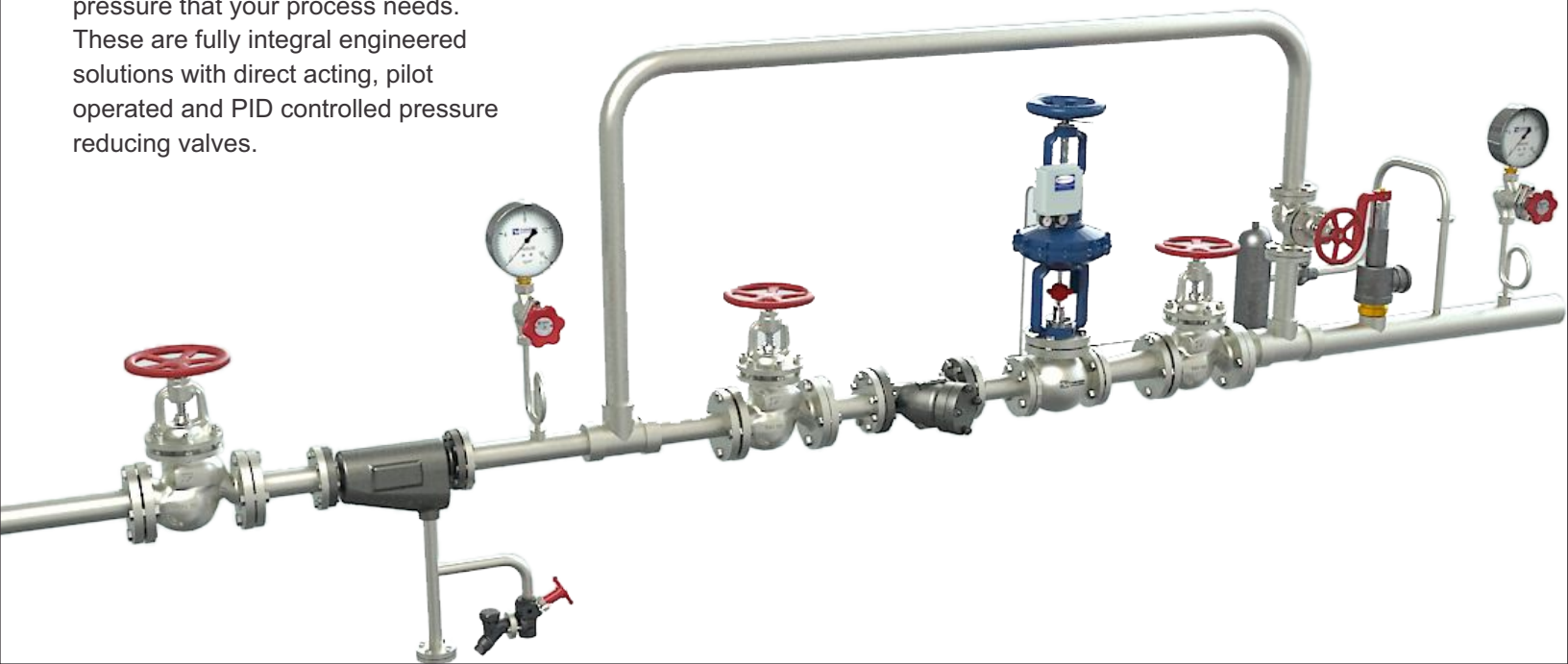
HeatMax

Compact, skid mounted hot water system, complete with online monitoring and control to deliver the right quantity of hot water efficiently at the right temperatures, equipped with state of the art fouling prediction system for high efficiency.



Forbes Marshall Pressure Reducing Station (FMPRS)

A Complete range of pressure reducing solutions to deliver the right steam pressure that your process needs. These are fully integral engineered solutions with direct acting, pilot operated and PID controlled pressure reducing valves.



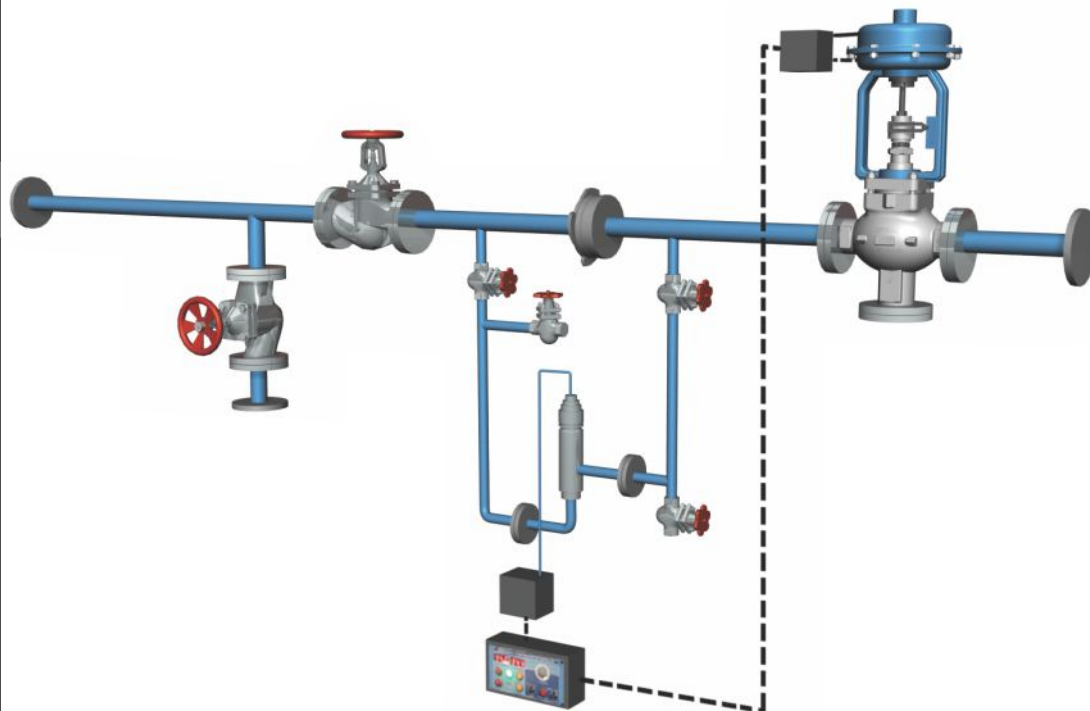
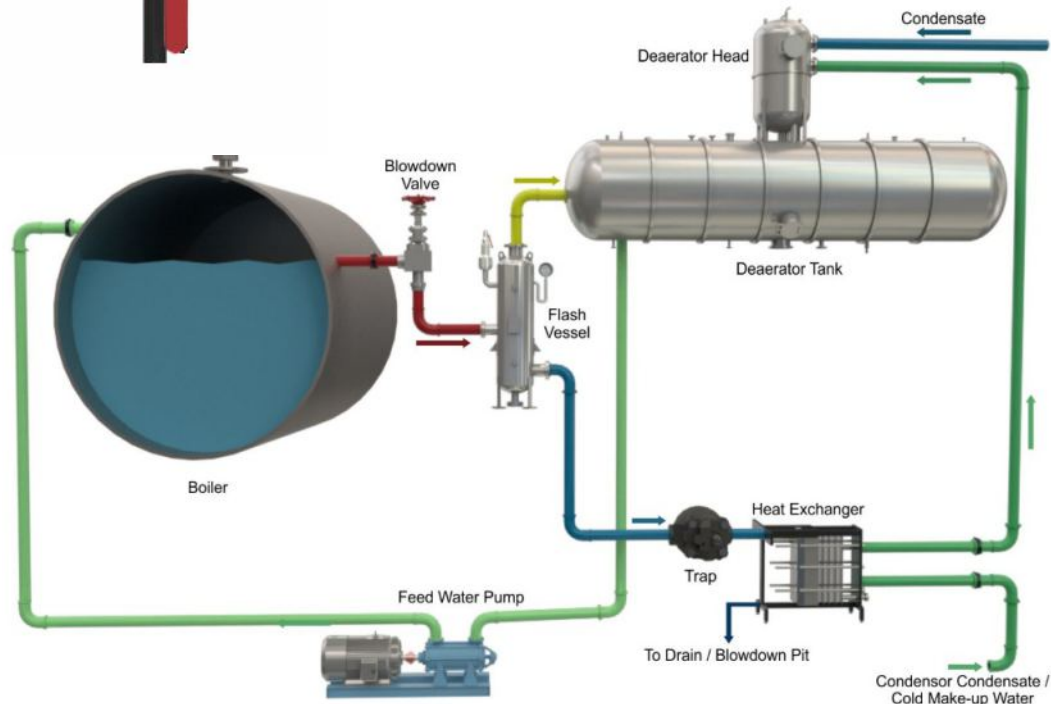


Boiler Blowdown Control System (BBCS)

If total dissolved solids (TDS) levels in the boiler water exceed the specified limits, it can lead to extensive corrosion and scaling in your boiler, steam, and condensate systems. The boiler blowdown control system regulates the correct amount of blowdown needed at the correct time. It ensures protection for your boiler, prolongs its life, saves money and eliminates dependence on the operator.

Blowdown Heat Recovery System

The blowdown heat recovery system ensures zero wastage of heat from blowdown operations and results in saving of fuel in the boiler firing. It is custom designed.



Condensate Contamination Detection System (CCDS)

This system monitors the conductivity/pH of condensate being returned to the boiler and diverts contaminated condensate to a drain.

Monitor Measure Control

You cannot manage what you do not measure. Forbes Marshall offers a full range of steam flowmetering packages to monitor energy consumption at equipment level and for overall plant steam system.



SteaMon

The SteaMon Vortex Flowmeter is specifically designed to measure the mass flow rate of saturated steam at all steam consuming locations.

Vortex Flowmeters

KROHNE Vortex Flowmeters, which work on the vortex shedding principle, are globally accepted as the standard in flow measurement of liquid, steam, air and gas flow. Ideal for tracking generation and consumption patterns in the plant.



Utility Metering Packages

These packages enable the metering of various utilities such as steam, compressed air, water and electricity across the plant to monitor accurate consumption for a finite measurement of utility cost.

Direct measurement of net/gross heat content in steam and hot water systems

Integrated temperature and pressure sensors provide input for Net heat measurement and Gross heat measurement

Net heat measurement is the calculation of net heat amount transferred into a system or a process and this feature can be used in both heating as well as cooling systems.

Determination of enthalpy by using algorithms according to IAPWS (International Association for the Properties of Water and Steam)

Net/Gross heat quantity value can be displayed in KJ, kWh, Btu etc. and it can also directly be transmitted through 4-20 mA current output or over HART to the DCS system for further calculations by the customer

Customer can use the data for allocation & billing of in-house energy cost

Common Applications :

Heat mass balancing of steam & condensate loop across the plant

Chilling or cooling units in hotel industries

Billing to individual users on the basis of TR or TOR (Ton of refrigeration) consumption in commercial complexes

Food & beverages industries

For High Purity Steam Needs

Clean steam and pure steam, that meets guidelines, is used to reduce the risk of product or process contamination in food and pharmaceutical industries.

Our clean steam product range is engineered and manufactured to meet the highest standards and specifications laid down by ISPE Baseline Guide, ASME Bioprocessing Equipment 2009, HTM2010/2031, 3As (Food and Beverage), FDA Inspection of high purity systems.

Clean Steam Pressure Reducing Valve (CSPRV)



Clean Steam Safety Valve (CSSV)

The Clean Steam Safety Valve is an all 316L stainless steel full lift safety valve. Typical applications include clean and pure steam, WFI, PW, compressed air supply to bioreactors, centrifuges, lyophilisers, sterilisers, process vessels, storage tanks and other gas and liquid applications.



Clean Steam Moisture Separator (CSSEP)

A unique product that enables clean and pure steam systems to comply with the dryness requirements of standards EN 285 and HTM 0101.



Clean Steam Trap (CST)

A comprehensive range of thermostatic steam traps that minimise condensate backup for critical steam-in-place applications and high-flow capacities for dual CIP/SIP processes.



Lowest Steam, Highest Productivity, Highest Quality Paper

The prime objective for the paper industry has always been to minimise specific fuel consumption through efficient generation of steam and subsequently its transportation and utilisation in the pulping process and paper machines, including condensate and flash recovery. Innovative solutions from Forbes Marshall help the pulp and paper industry to efficiently use steam.

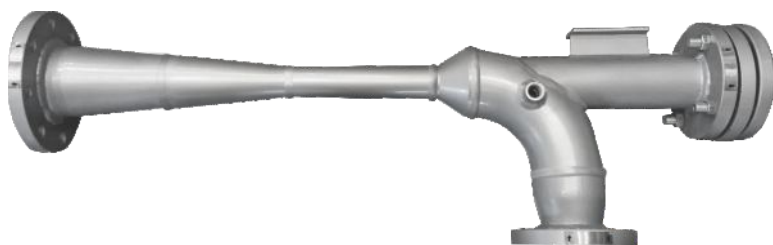


Rotary Joint

A rotary joint is only as good as its seals. The Forbes Marshall rotary joints use antimony impregnated carbon graphite, for perfect sealing to increase the efficiency of condensate removal. The special design eliminates costly downtimes.

Thermocompressor

Thermocompressor systems directly impact the bottomline by compressing low pressure flash steam or exhaust steam to a higher pressure / temperature, reclaiming energy which would otherwise have been vented.



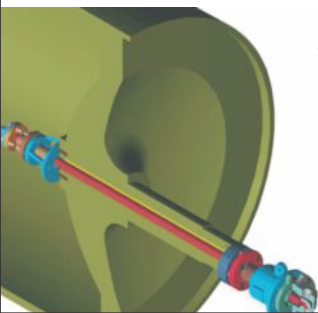
Hood and Pocket Ventilation System

Forbes Marshall's high efficiency closed hood and pocket ventilation systems improve dryer section efficiency and heat recovery in paper machines. Together, the pocket ventilation system and heat recovery ensure full control over drying performance and energy consumption in the dryer section.



Syphon

Available in stationary, fixed bend and rotary designs suitable for low speed to high speed machines



Paper Machine System

Our paper machine systems ensure highest drying rates with minimum steam consumption. They can be installed on low speed board or kraft machines to high speed newsprint, writing, printing paper machines as well as yankee tissue driers. The systems are customised based on machine speeds and other affecting parameters.



Turbumax

The robust high efficiency Turbumax , offers optimum heat transfer for high speed dryers. The stainless steel bars ensure wear resistance and the ring gives an extended high performance life.



Your local Forbes Marshall representative would be happy to provide you with further information and support.

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