

Steam and Process Control Solutions

Paper and Corrugated Board Industry

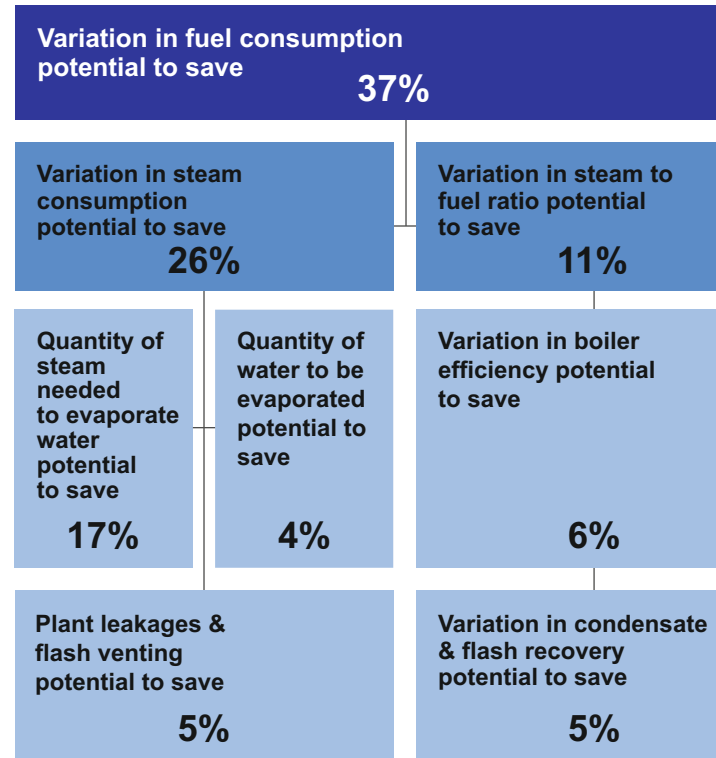


Trusted Partners in Energy Conservation

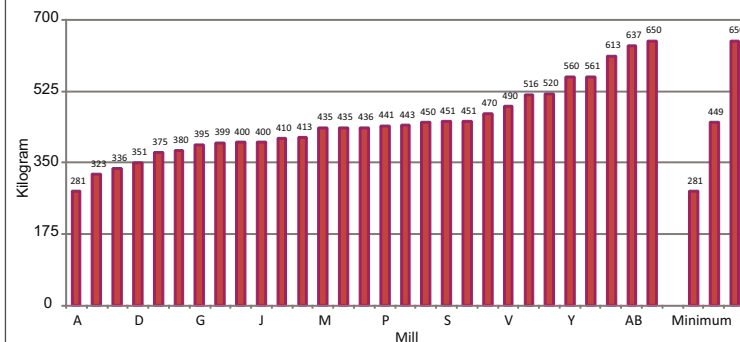
For over 70 years, we have partnered the Industry in providing solutions in control instrumentation, energy conservation and environmental monitoring. Our teams of the finest engineers are dedicated to serve process industry across diverse sectors. World class manufacturing facilities and technology enable us deliver quality solutions globally. Our unique complimentary expertise enables us engineer customised systems that improve manufacturing processes, conserve energy and are environmentally sustainable. We partner customers with our knowledge, comprehensive range of services, products and solutions for utilities and process control.

Paper Mill

Avenues of Potential in a Paper Mill Based on A Survey of Waste Paper Based Mills

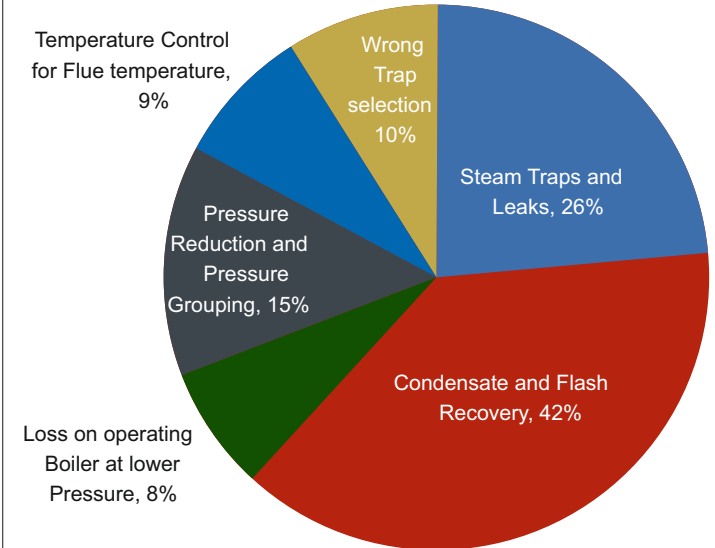


Specific Fuel Consumption

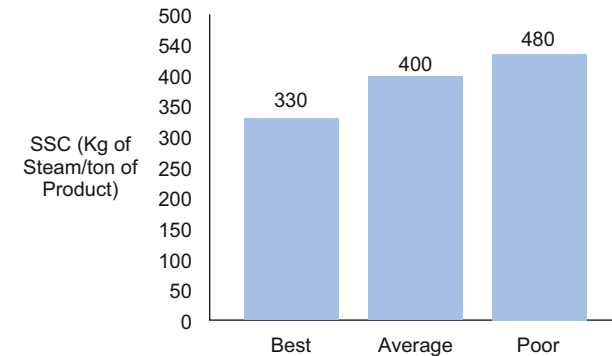


Corrugation Board

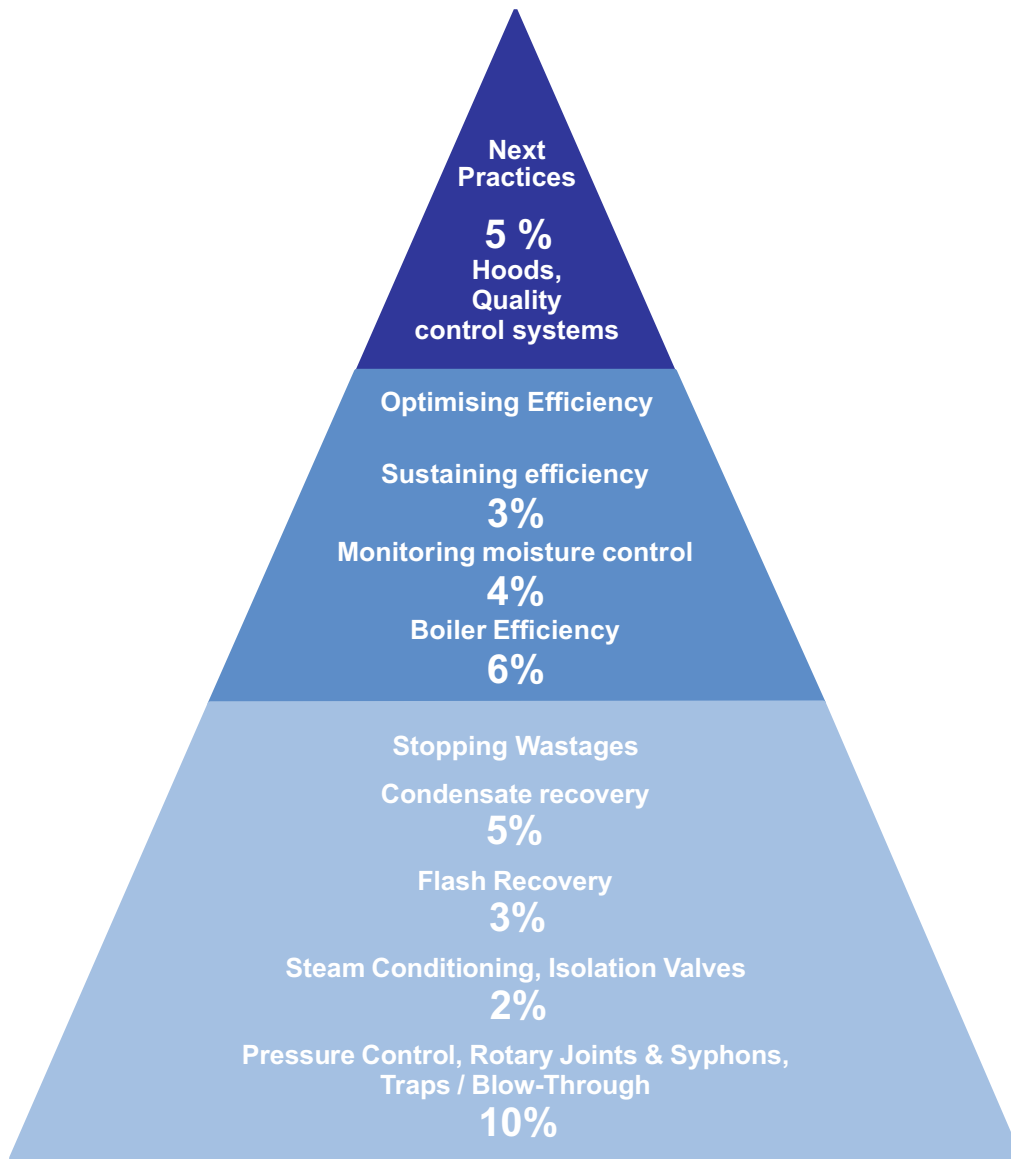
Opportunities for Steam System Efficiency Improvement



Gaps Between Best and Poor





The Energy Conservation Triangle - Prioritising Improvements in the Paper Industry



Energy Services for the Paper Industry

Forbes Marshall provides services to help build reliable, energy efficient utility systems for the process industry thereby achieving new benchmarks.

- | | | | | | |
|---|---|---|----|---|---------------------------------|
| 1 |  | Basic and Detail Engineering | 7 |  | Steam System Training |
| 2 |  | Project Management | 8 |  | Energy Audits |
| 3 |  | Steam System Design Hazop | 9 |  | Safety Audits |
| 4 |  | Cogen Feasibility and Engineering | 10 |  | De-bottleneck Audits |
| 5 |  | Stress Analysis | 11 |  | Energy Management System Audits |
| 6 |  | Process Energy Optimisation with Automation | 12 |  | Steam System Management |

Forbes Marshall Helps in Reduce Energy Consumption

The Forbes Marshall thermocompressor and cascade based steam and condensate system resulted in improvement of drying rates by 15% and ramped up machine speed by 33% from 200 mpm to 300 mpm. The productivity improved from 110 TPD to 170 TPD with reduction in specific steam consumption from 2.8 kg of steam/ kg of paper to 1.6 kg of steam / kg of paper.

A Leading Paper Mill In Egypt

The Forbes Marshall thermocompressor, stationary syphons and condensate recovery system resulted in improvement of drying rates and helped achieve specific steam consumption of 1.25 ton/ton of paper with machine speeds ramped upto 350 mpm. Drying rates of 18-21 kg/h-sq.m which is in line with TAPPI standards . Condensate recovery factor of 93% achieved.

Paper and Pulp Mill in West India

The Forbes Marshall steam trap based steam and condensate system resulted in improved surface temperature of dryers from 90 °C to 115 °C. Machine speed ramped by 30% from 70 mpm to 100 mpm. Productivity improved from 45 TPD to 70 TPD with reduction in specific steam consumption from 230 liters of LDO / Ton of paper to 160 liters of LDO /Ton of paper.

Pulp and Paper Mill in Egypt

Installation of float trap and temperature control system on hot plates and drying cylinders helped reduce the specific steam consumption by 15%. We were also able to improve the quality of board with lower rejections by maintaining the gel point in the desired range.

A Leading Corrugated Board Manufacturer in North India

Design of steam and condensate loop by Forbes Marshall has helped us achieve complete heat and mass balance and a specific fuel consumption of 22 lit of furnace oil per ton of paper.

A Leading Board Manufacturer in South India

We achieved a saving of 12% In our fuel bill by replacing water logged traps and recovery of condensate back into feedwater tank. The flash steam is used in steam shower which has given an additional saving of a percent in annual fuel bill. Our overall makeup water consumption has also reduced by 22%. We thank Forbes Marshall for their inputs and engagement to help us achieve savings.

A Leading Corrugation Manufacturer in South India



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Krohne Marshall
Forbes Marshall Arca
Codel International
Forbes Vyncke
Forbes Marshall Steam Systems

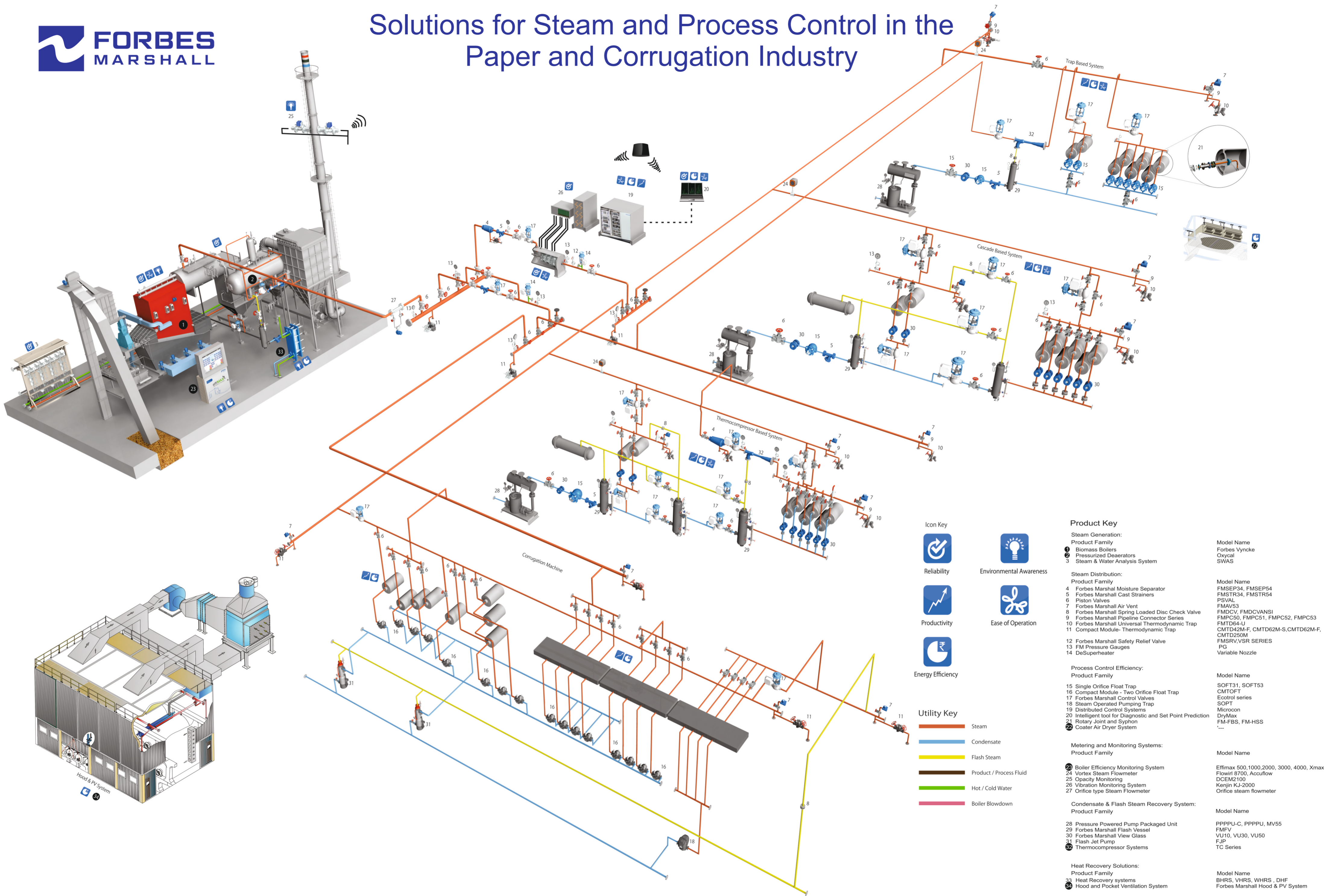
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Solutions for Steam and Process Control in the Paper and Corrugation Industry



Icon Key



Reliability



Productivity



Energy Efficiency



Environmental Awareness



Ease of Operation

Utility Key

- Steam
- Condensate
- Flash Steam
- Product / Process Fluid
- Hot / Cold Water
- Boiler Blowdown

Product Key

Steam Generation:

Product Family

- 1 Biomass Boilers
- 2 Pressurized Deaerators
- 3 Steam & Water Analysis System

Model Name
Forbes Vyncke
Oxycal
SWAS

Steam Distribution:

Product Family

- 4 Forbes Marshall Moisture Separator
- 5 Forbes Marshall Cast Strainers
- 6 Piston Valves
- 7 Forbes Marshall Air Vent
- 8 Forbes Marshall Spring Loaded Disc Check Valve
- 9 Forbes Marshall Pipeline Connector Series
- 10 Forbes Marshall Universal Thermodynamic Trap
- 11 Compact Module- Thermodynamic Trap
- 12 Forbes Marshall Safety Relief Valve
- 13 FM Pressure Gauges
- 14 DeSuperheater

Model Name
FMSEP34, FMSEP54
FMSTR34, FMSTR54
PSVAL
FMAV53
FMDCV, FMDCVANSI
FMPC50, FMPC51, FMPC52, FMPC53
FMTD64-U
CMTD42M-F, CMTD62M-S, CMTD62M-F,
CMTD250M
FMSRV, VSR SERIES
PG
Variable Nozzle

Process Control Efficiency:

Product Family

- 15 Single Orifice Float Trap
- 16 Compact Module - Two Orifice Float Trap
- 17 Forbes Marshall Control Valves
- 18 Steam Operated Pumping Trap
- 19 Distributed Control Systems
- 20 Intelligent tool for Diagnostic and Set Point Prediction
- 21 Rotary Joint and Syphon
- 22 Coater Air Dryer System

Model Name
SOFT31, SOFT53
CMTOFT
Ecotrol series
SOFT
Microcon
DryMax
FM-FBS, FM-HSS
....

Metering and Monitoring Systems:

Product Family

- 23 Boiler Efficiency Monitoring System
- 24 Vortex Steam Flowmeter
- 25 Opacity Monitoring
- 26 Vibration Monitoring System
- 27 Orifice type Steam Flowmeter

Model Name
Effimax 500, 1000, 2000, 3000, 4000, Xmax
Flowiri 8700, Accuflow
DCEM2100
Kenjin KJ-2000
Orifice steam flowmeter

Condensate & Flash Steam Recovery System:

Product Family

- 28 Pressure Powered Pump Packaged Unit
- 29 Forbes Marshall Flash Vessel
- 30 Forbes Marshall View Glass
- 31 Flash Jet Pump
- 32 Thermocompressor Systems

Model Name
PPPPU-C, PPPPU, MV55
FMFV
VU10, VU30, VU50
FJP
TC Series

Heat Recovery Solutions:

Product Family

- 33 Heat Recovery systems
- 34 Hood and Pocket Ventilation System

Model Name
BHRS, VHRs, WHRS , DHF
Forbes Marshall Hood & PV System