



Steam and Process Control Solutions

Food Industry

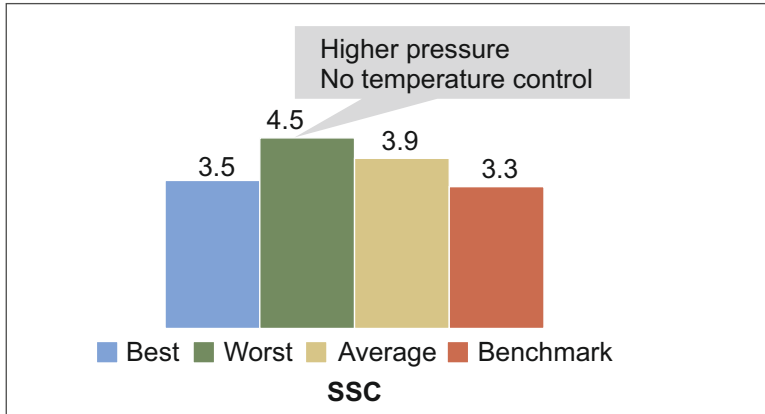


Steam and Process Control Solution

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 in steam engineering and process control enable us engineer customised systems that improve manufacturing processes, conserve energy and are environmentally sustainable.

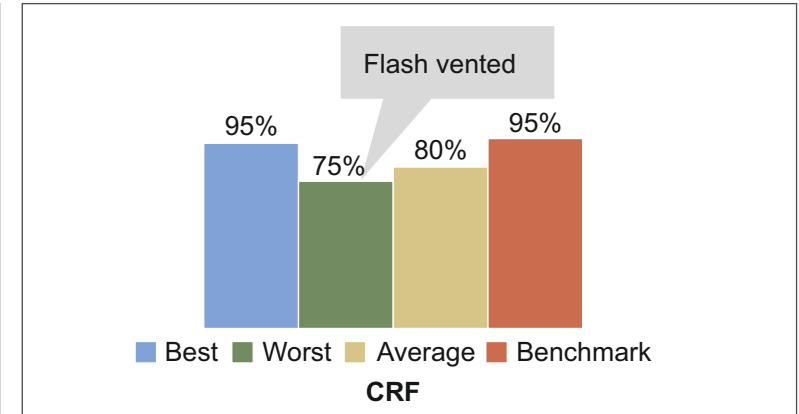
We partner customers with our knowledge, comprehensive range of services, products and solutions for utilities and process control.

Snacks Industry: The snack industry is growing at a rapid rate. Multiple players and thin margins make the sector very competitive. Reliability and minimum cost of utilities are very critical to sustainability.



Bridging the Gap in SSC

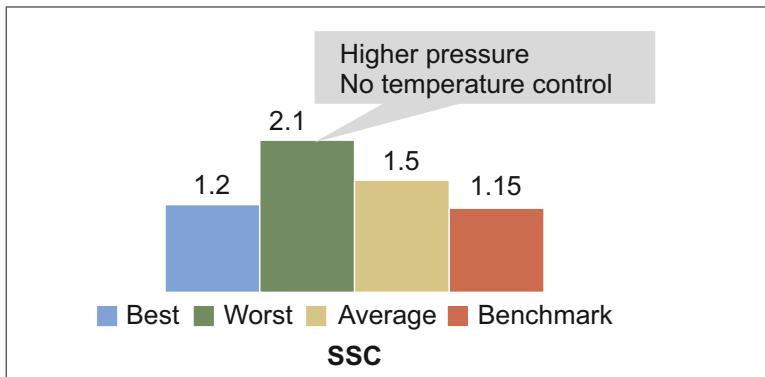
Precise control of oil temperature under varying heat load due to moisture variation in potato
Effective condensate evacuation



Bridging the Gap in CRF

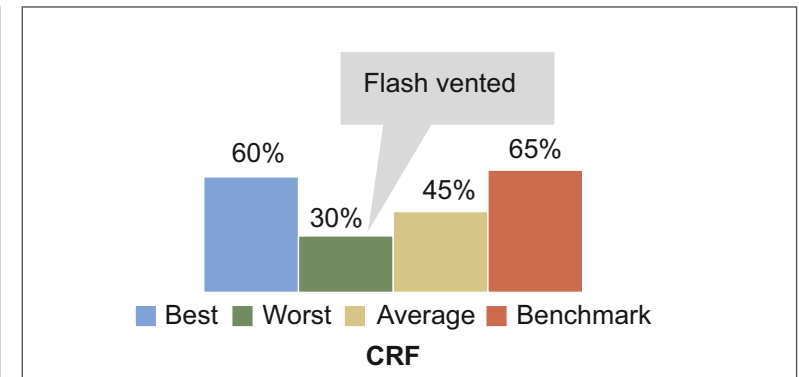
Recovery of complete energy in flash and condensate
Secondary use of flash in process or Vapor Absorption Machine

Noodles: In noodle manufacturing there is limited control over raw material costs, utility costs are key focus for cost reduction.



Bridging the Gap in SSC

Steady and constant pressure is critical to the process
0.5 bar(g) steam pressure for steamer



Bridging the Gap in CRF

Use of flash jet pump (patent applied) to recover flash in steamer and condensate to boiler house

Confectionery

The confectionery business operates on fixed price points and innovation is the key to competitive growth. The main challenge is manufacturing of multiple products and rapid changeovers.

Concerns and Steam Solutions

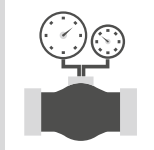


Hygiene

Designed to ensure "ZERO LEAKAGE"

Leakage is attributable to bi-phase flow of steam and condensate

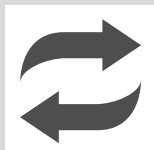
Proper moisture separation and condensate removal is the key



Product Quality

Precise temperature regulation on cookers

Hot water availability in right quantity and at the right temperature



Change Overs

Air venting to ensure quick start-up and temperature rise

Instantaneous availability of hot water

Automated steam supply control to meet product variations



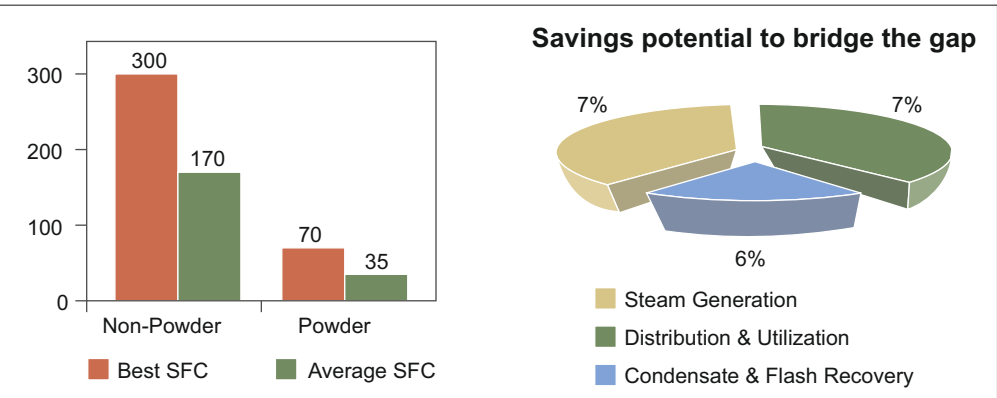
Expansions

Confectionery units undergo multiple organic expansion

Quick expansions need updated and as built drawings, plug and play systems and effective design for future provisions

Dairy

Our detailed audits and plant surveys across dairies reveal that each dairy requires a different quantity of steam and fuel to process a unit quantity of milk.



| Process Parameters | Problems | Solutions |
|--|---|---|
| Pasteurisation Temperature: 72-80°C Holding time: 10-20 sec | Variation in set temperature and loss of productivity due to recycling of milk | Stable boiler pressure and correct line sizing Sizing and response of temperature control valve Condensate evacuation and trap selection |
| Ghee Boiler Temperature: 105°C Cycle time: 90 to 120 min | Manual operation with to 5°C temperature overshoot Black debris formation Loss of steam due to bypass opening | Automation in temperature control Effective condensate evacuation to reduce batch time without wasting steam. |
| MEE Milk solid concentration: 6-10% to 44% | Drop in productivity due to fluctuating steam pressure | Checking the steam pressure and low-rate fluctuations Establishing any heat transfer surface scaling by checking the LMTDs Study of the vacuum system and pressure maintained |
| Dryer efficiency Solid concentration: 99% Hot air temperature: 175°C | Ineffective condensate evacuation due to group trapping Leakage of coils due to bi-phase low | Designing the steam and condensate system Individual trapping for no coil leakage and best efficiency |

Forbes Marshall Helps Reduce Energy Consumption

We have achieved a sustained saving of 18% on our annual fuel bill by implementing the condensate management solution recommended and supplied by Forbes Marshall. We are also able to achieve specific steam consumption of 66 litres of milk per litre of furnace oil.

A Dairy in South India

We have implemented the energy saving solution, designed and supplied by Forbes Marshall. Our plants currently operate at optimum specific steam consumption of 1.2 MT of steam per ton of production.

A Leading Noodle Manufacturer

With revamp of steam trapping and condensate recovery system we are able to achieve feedwater temperature of 95°C plus. Automation of cookers has improved the productivity.

Confectionary Manufacturer in North India

Forbes Marshall has redesigned our steam system for pasteurization which has resulted in zero rejections. Temperature control and steam trapping has improved productivity and delivered savings.

A Leading Dairy

We have been able to achieve specific steam consumption by 12% coupled with an increase in condensate recovery by 10%. Implementation of Forbes Marshall steam solutions has helped us achieve this reduction.

A Leading Packaged Food Manufacturer

We have changed over our fryers from gas fired to steam based with complete design engineering and supply of steam system by Forbes Marshall. This has enabled us to achieve the same quality and productivity at one-fourth the cost.

A Multinational Packaged Food Company



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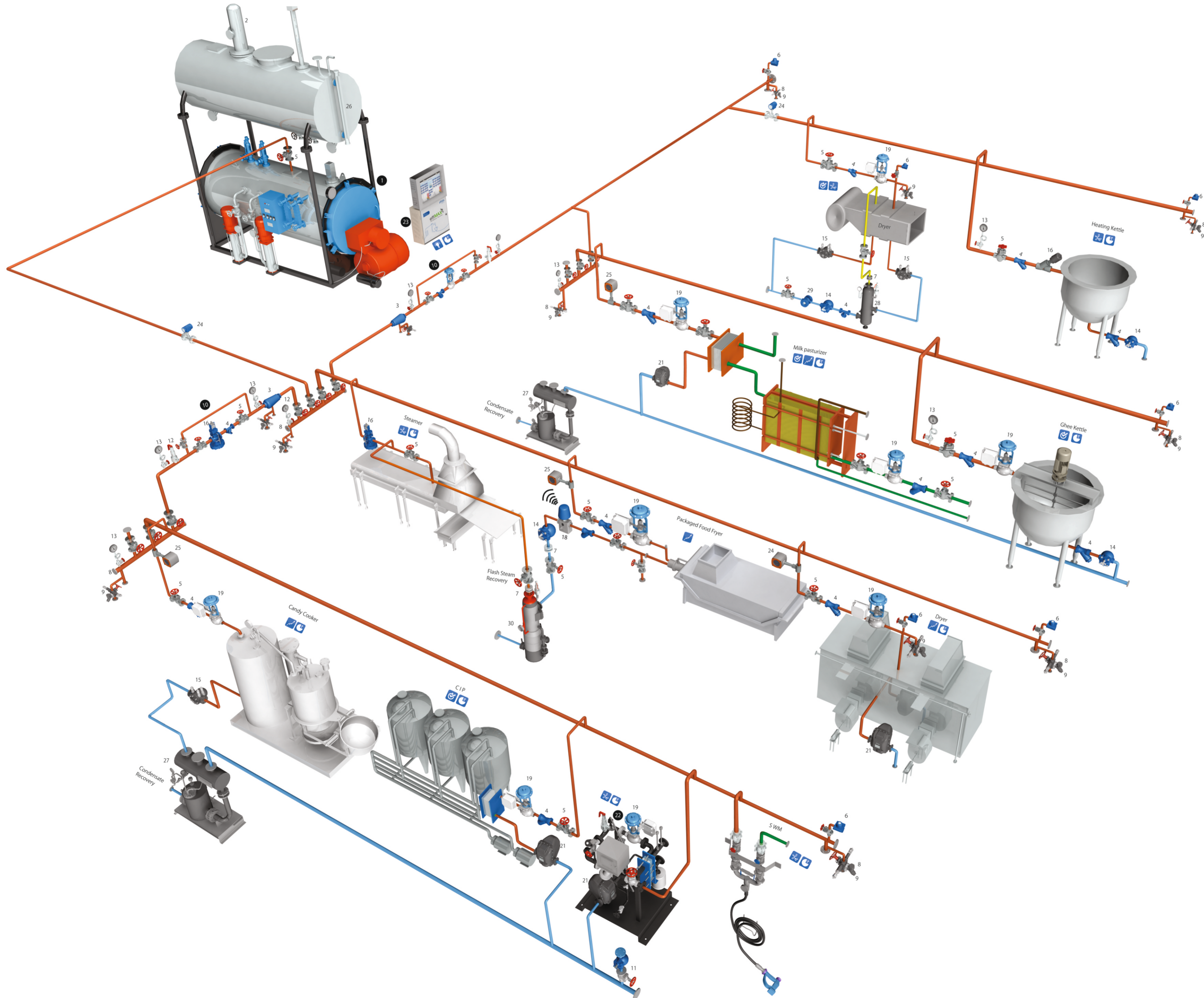
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- Icon Key**
- Reliability
 - Productivity
 - Energy Efficiency

- Environmental Awareness
- Ease of Operation

- Utility Key**
- Steam
 - Condensate
 - Flash Steam
 - Product / Process Fluid
 - Hot / Cold Water

- Product Key**
- Steam Generation:**
 Product Family
 1 Forbes Marshall Modular Boilers
 2 Atmospheric Deaerator Head
- Steam Distribution:**
 Product Family
 3 Forbes Marshall Moisture Separator
 4 Forbes Marshall Cast Strainers
 5 Piston Valves
 6 Forbes Marshall Air Vent
 7 Forbes Marshall Spring Loaded Disc Check Valve
 8 Forbes Marshall Pipeline Connector Series
 9 Forbes Marshall Universal Thermodynamic Trap
 10 Forbes Marshall Pressure Reducing Stations
- Process Control Efficiency:**
 Product Family
 14 Single Orifice Float Trap
 15 Compact Module - Two Orifice Float Trap
 16 Forbes Marshall Pilot Operated Pressure Reducing Valve
 17 Forbes Marshall Piston Actuated Valves
 18 Forbes Marshall Sensor Chamber
 19 Forbes Marshall Control Valves
 20 Forbes Marshall Steam and Water Mixer
- Metering and Monitoring Systems:**
 Product Family
 23 Boiler Efficiency Monitoring System
 24 Vortex Steam Flowmeter
 25 Vortex Steam Flowmeter
 26 Level Control System
- Condensate & Flash Steam Recovery System:**
 Product Family
 27 Pressure Powered Pump Packaged Unit
 28 Forbes Marshall Flash Vessel
 29 Forbes Marshall View Glass
 30 Flash Jet Pump
- | | |
|------------|---|
| Model Name | FMDH |
| Model Name | FMSE34, FMSE54 FMSTR34, FMSTR54 PSVAL FMAV53 FMDCV, FMDCVANSI FMPC50, FMPC51, FMPC52, FMPC53 FMTD64-U FMPRS-PO, FMPRS-ROB, FMPRS-PID |
| Model Name | FMAE31, FMAE53 FMSRV, VSR series PG |
| Model Name | SOFT31, SOFT53 CMTOFT FMPRV41, FMPRV53, DSPRV41 FMPAV SC31, SC53 Ecotrol series SWM |
| Model Name | SOPT HEATMAX |
| Model Name | Effmax 500, 1000, 2000, 3000, 4000, Xmax Flowirl 8700, Accuflow SteaMon Bm26 |
| Model Name | PPPPU-C, PPPPU, MV55 FMFV VU10, VU30, VU50 FJP |