

Spirax FEME

flash recovery energy management equipment



First for Steam Solutions

EXPERTISE | SOLUTIONS | SUSTAINABILITY

spirax
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Spirax FREME

Spirax FREME (Flash Recovery Energy Management Equipment) is an innovative heat recovery system that delivers major energy savings by recovering waste heat from a condensate return system and using it to pre-heat boiler feedwater.

Heat and water previously lost can be effectively recovered, reducing utility bills, water treatment chemical costs and CO² emissions.

Spirax FREME is proven to be able to achieve energy savings of up to 10%, giving a potential return on investment within months.

- Tested and pre-assembled unit minimises design and installation time
- Plate heat exchanger offers efficient and robust heat transfer technology
- Reduce your energy bills and CO² emissions
- Saves energy by increasing boiler efficiency
- Reduces unsightly plumes of flash steam



Proven energy savings

Using condensate returned from the steam distribution system to heat boiler feedwater is an extremely effective energy saving measure. For every 6°C rise in boiler feedwater, 1% is typically reduced off the boiler energy bill. However, many steam systems fail to recover all the heat in returned condensate because:

- It would raise the feedtank temperature from the typical 85°C to 90°C to above boiling point, causing cavitation that can damage boiler feed pumps.
- Up to half of the recoverable energy in condensate can be lost as flash steam when condensate leaves a pressurised steam system and returns to atmospheric pressure.

The Spirax FREME system solves all these issues by feeding virtually all the energy from the returned condensate into the high-pressure side of the boiler feedpumps. The higher pressure means the boiler feedwater can be heated to well over 100°C without boiling and causing pump cavitation.

By installing a Spirax FREME within your plant, nearly all plant condensate and flash steam will be returned and its energy recovered. As well as saving this valuable energy, Spirax FREME eliminates external venting of flash steam, visibly supporting your company's environmentally friendly operations and brand image.

Product range

Feedwater flowrate kg/h	Type	Dimension/weights approximate in mm and kg				Connections			
		Height	Length	Width	Weight	Condensate		Feedwater	
						Inlet	Outlet	Inlet	Outlet
7500	FR-1	1850	1750	850	630	DN80	DN50	DN50	DN50
15000	FR-2	2000	2150	850	780	DN100	DN50 DN40	DN50	DN50

NOTE:

- FREME FR-2 maximum condensate return rate 15000 kg/hr. Flash steam pressure 2 bar-g with a back pressure of 50 kPa (i.e. 5 metre lift)
- Spirax Sarco technical assistance is recommended when considering FR1 and FR2 requirements.

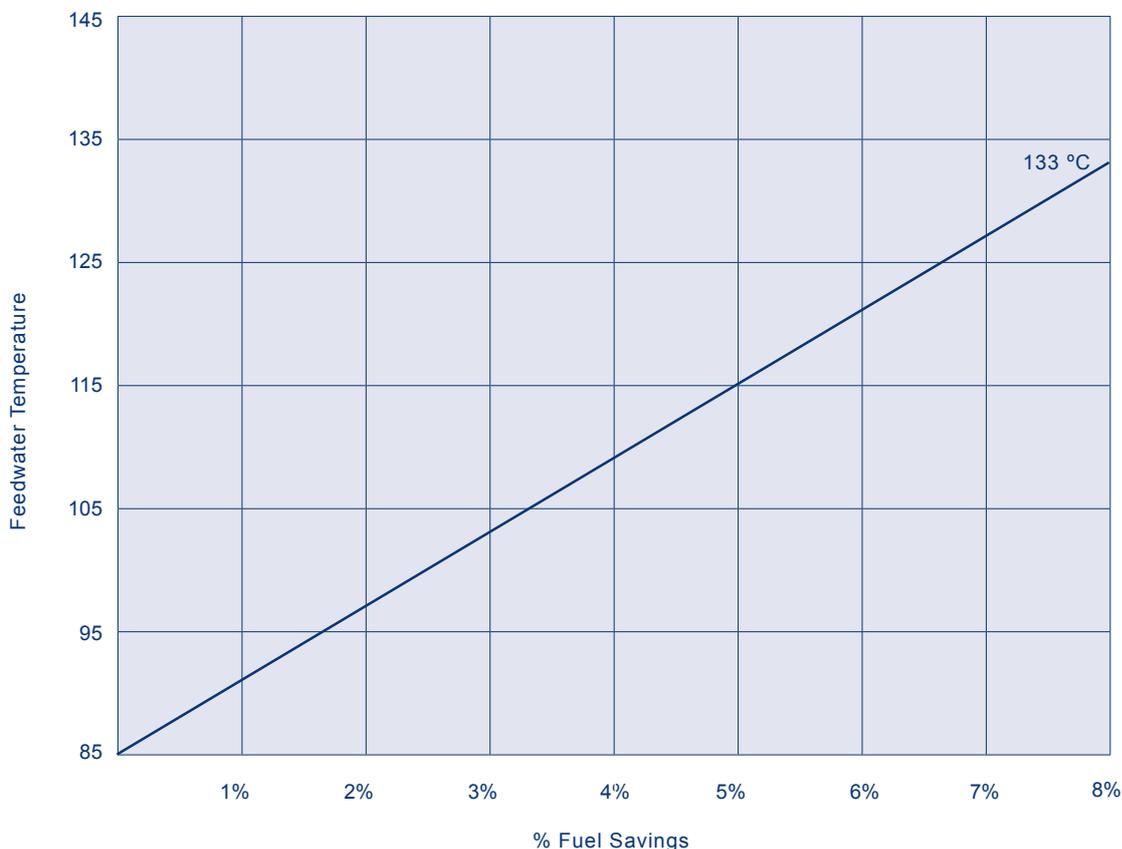
Benefits for every industry

Spirax Sarco FREME can bring significant benefits to steam system operators in any industry.

- Brewing and Distilling
- Food and Beverages
- Meatworks (Rendering)
- Timber Drying
- Oil and Petrochemical
- Pharmaceutical
- Pulp and Paper
- Sugar Refining



Example of fuel savings when increasing feed water temperature with a Spirax FREME



Graph based on conditions: Boiler Steam Pressure 10 bar-g and Flash Steam Pressure 2 bar-g

FREME Fuel Savings Example:

Site Conditions	
Steam Pressure	8.6 bar-g
Flash Steam Pressure	2 bar-g
Feed Water Temperature	95°C
Fuel	Natural Gas
Fuel Cost	\$12.00 Gj
Operating Time	14 hours x 5 days x 50 weeks
Condensate Load	5000 kg/hr
Feed Water Flow Rate	7000 kg/hr

Cost of Steam with Feed Water @ 95 °C

Boiler Efficiency: 80%

Water Costs Total: \$3.50 per M3

Condensate Return: 71%

Blowdown Rate: 5%

\$36.86 per 1000kg of steam

Cost of Steam with Feed Water @ 127 °C

Boiler Efficiency: 80%

Water Costs Total: \$3.50 per M3

Condensate Return: 71%

Blowdown Rate: 5%

\$34.85 per 1000kg of steam

Cost of Steam per Year with Feed Water @ 95 °C

$\$36.86 \times 7 \text{ T/hr} \times 3500 \text{ hrs} = \$903,070 \text{ per year}$

Cost of Steam per Year with Feed Water @ 127 °C

$\$34.85 \times 7 \text{ T/hr} \times 3500 \text{ hrs} = \$853,825 \text{ per year}$

Fuel Savings

$\$903,070 - \$853,825 = \$49,245 \text{ per year}$

Water Savings \$1529.5 total per year

$\$1.53 \text{ hr} \times 3500 \text{ hrs} = \$5,353 \text{ per year}$

Total Predicted Savings

$\$49,245 + \$5,353 = \$54,598 \text{ per year}$

*Predicted CO2 reduction 4018 GJ saved per An = 206.52 T/An in CO2**

* Department of Environment and Energy National Greenhouse Accounts Factors July 2017

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