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Heat recovery from boiler blowdown

First for Steam Solutions

EXPERTISE | SOLUTIONS | SUSTAINABILITY

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Increase energy efficiency and cut costs by recovering heat and water from TDS blowdown

Steam boilers need to be blown down to control the level of Total Dissolved Solids (TDS) in the boiler water.

Usually, a TDS system opens a valve to discharge boiler water when the conductivity rises above a pre-set limit. Relatively low TDS feedwater then replaces the discharged boiler water.

How the system works

Steam flashes from the blowdown water in the flash vessel, and is fed directly back to the feedtank. A float trap drains the residual water, which, if still hot, is fed into a heat exchanger to warm the circulating cold water make-up.

User benefits

- Can recover up to 80% of the heat from blowdown.
- Reduces expensive treated make-up water by recovering flash steam.
- Rapid pay-back time from complete system package.
- Flash vessel designed and constructed to ASME VIII for enhanced safety.
- Stainless steel heat exchanger plates can be removed for examination without disturbing pipework.
- Reduces temperature of blowdown water for safer disposal.

System selection

The required blowdown volume is determined by the maximum allowable cycles of concentrate of the boiler relative to the incoming feedwater TDS. In operation, over varying loads, the rate of blowdown will change and due to these variables, a Spirax Sarco automatic TDS system is recommended to ensure stability in the boiler over all conditions.

Heat recovery systems should always take into consideration the maximum boiler blowdown rate allowable, except in the case of multiple boilers where it is known that the boilers will never operate together. It is always recommended that a Spirax Sarco representative be consulted when sizing and selecting blow down heat recovery equipment.

Below is an example of the heat recovery potential on a typical boiler system:

$$\text{Blowdown rate} = \frac{FS}{B - F}$$

Where:

F = Feedwater TDS (ppm)

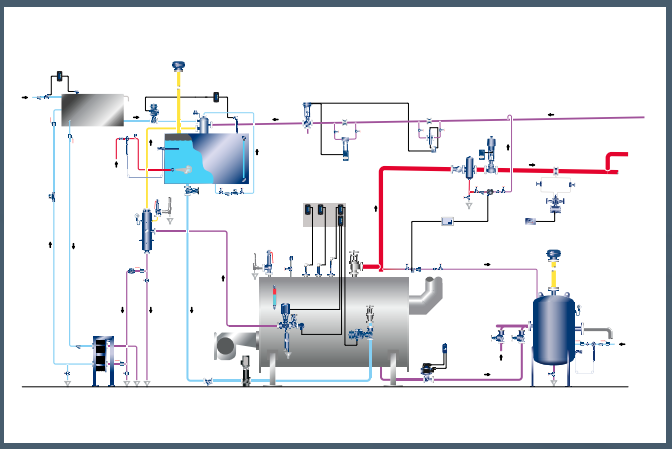
S = Steam generation rate (kg/h)

B = Required boiler water TDS (ppm)

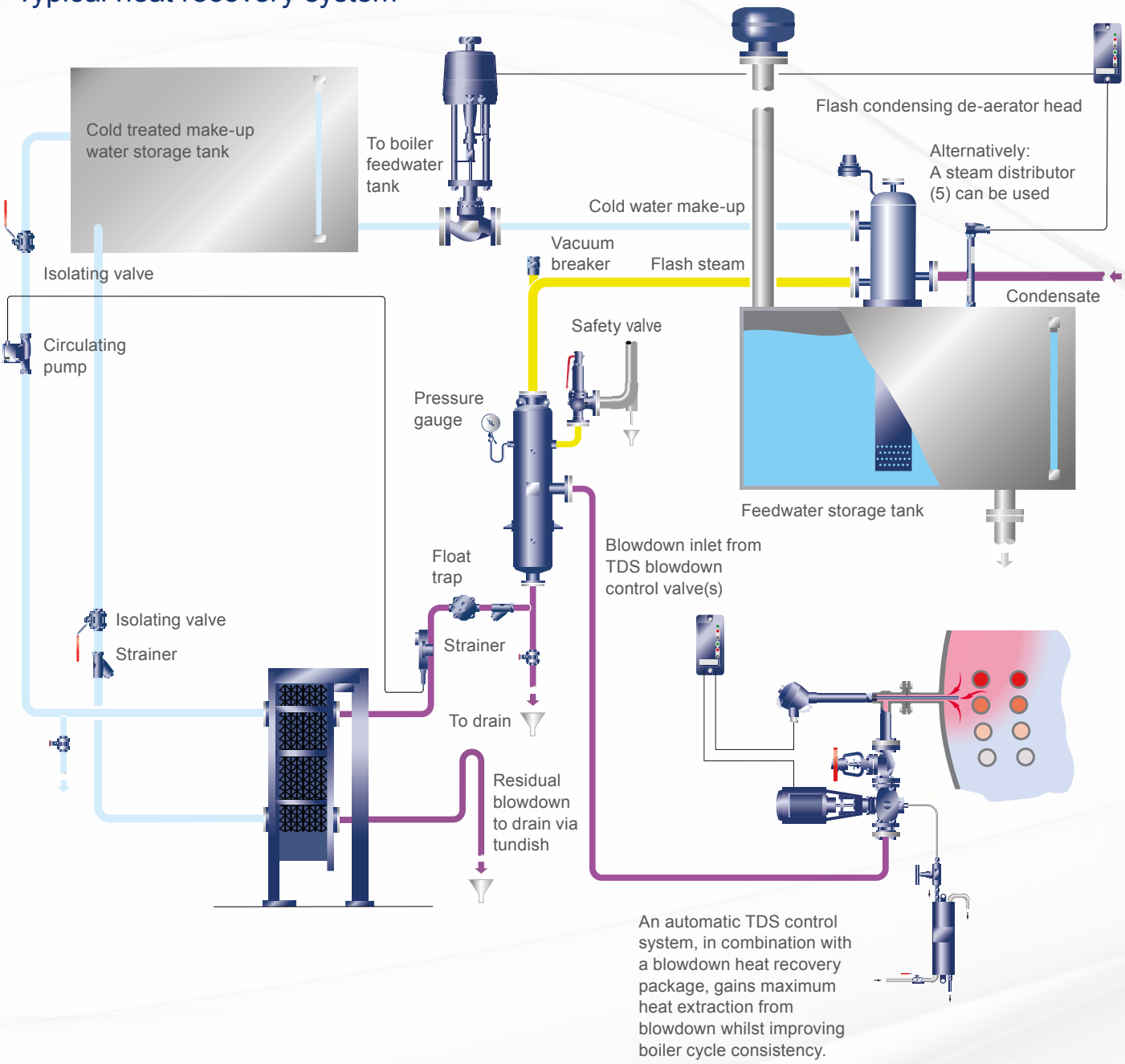
Heat Recovery Example

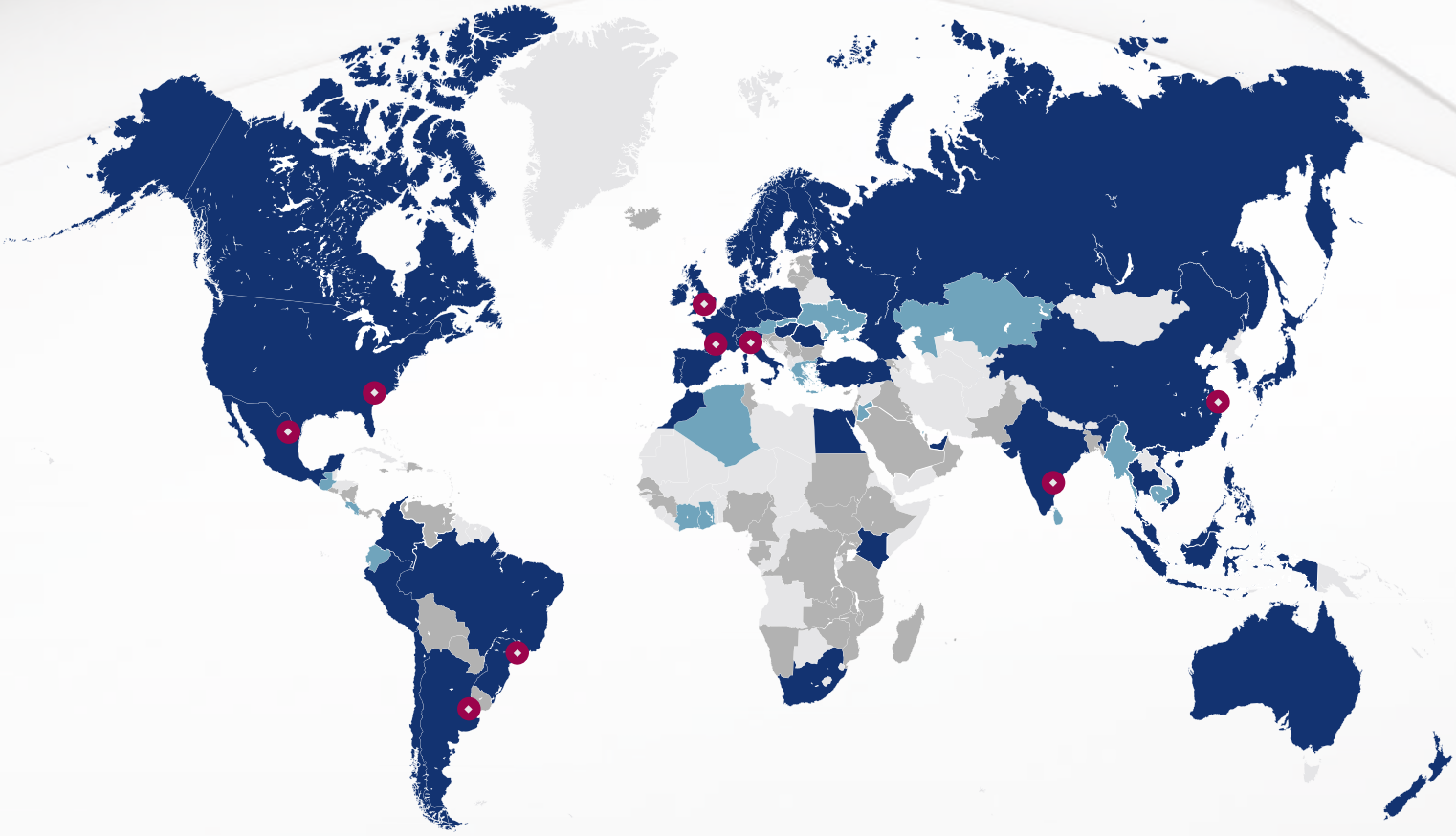
Boiler operating at 10Bar G with a blowdown rate of 5% operating on natural gas with a typical 50% condensate return, has been used in the below example:

Blowdown =	5% of Total Output
Cost of Blowdown =	2.4% of Total Costs
Heat Recovery of Total Costs =	1.0%



Typical heat recovery system





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