

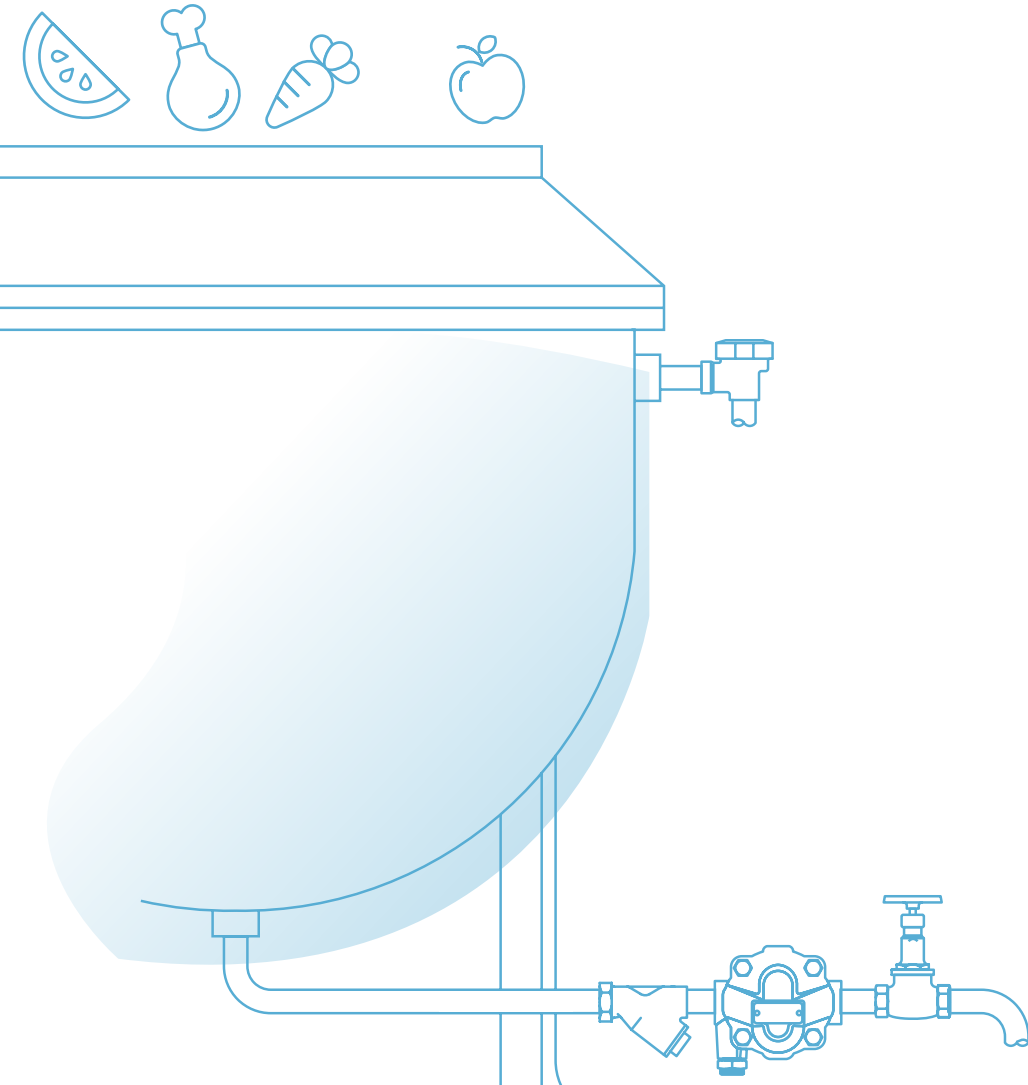


# FLASH STEAM RECOVERY IN FOOD & BEVERAGE MANUFACTURING

AN E-GUIDE TO REDUCING VISIBLE EMISSIONS AND ENERGY AND WATER CONSUMPTION AT YOUR PLANT

**spirax**  
**sarco**

# WELCOME



This E-guide is for manufacturers of food and beverage products who are using steam at their facility. Steam systems can be responsible for over 50% of a facility's energy costs and if not managed properly, can waste significant amounts of energy and water to atmosphere, instead of conserving or recycling it.

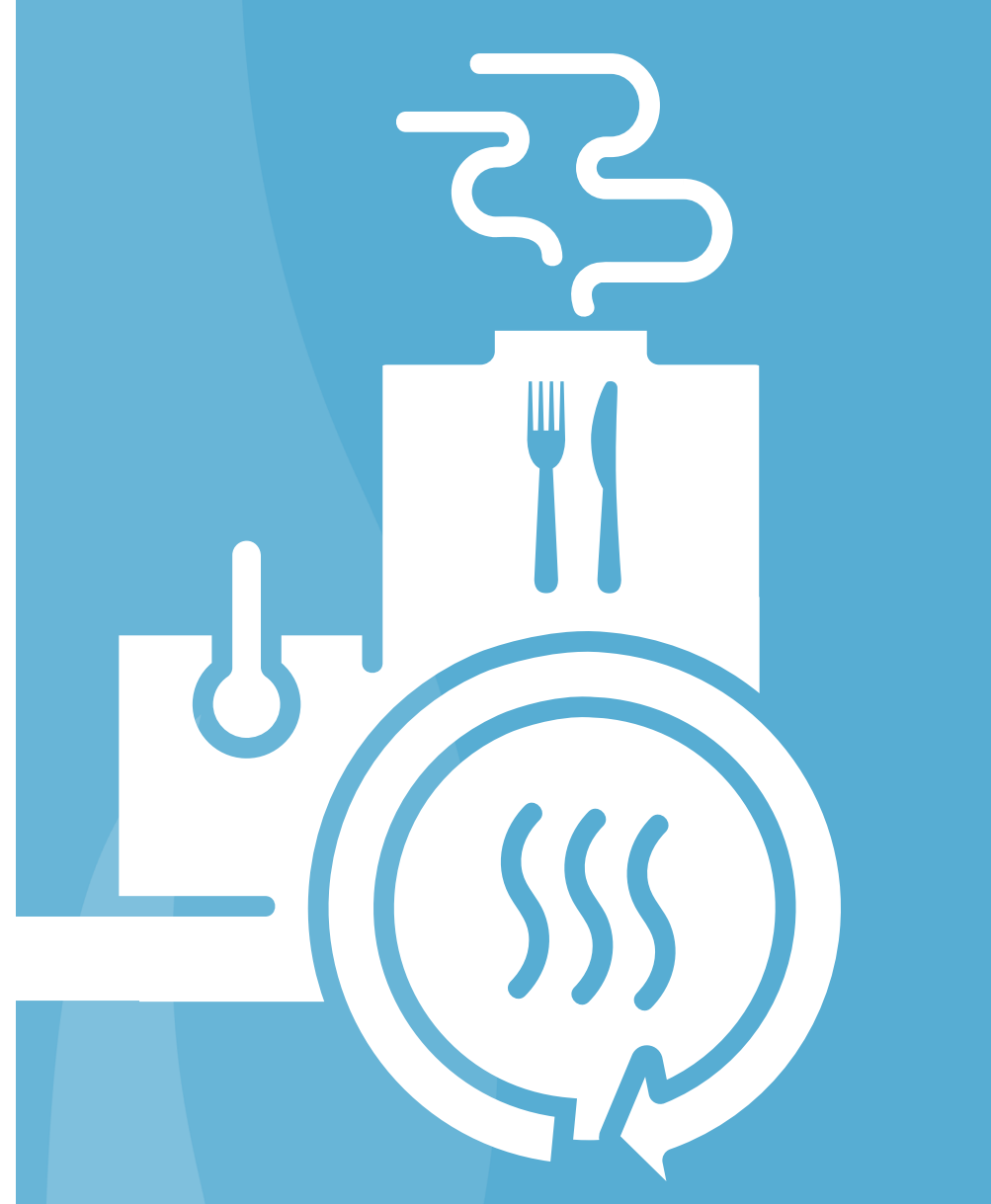
In this E-guide, we will explore the reason why plumes of steam are visible from most food and beverage manufacturing facilities and what you can do to control them, while also helping you meet sustainability targets, reduce pressure from your local community and protect personnel on your site.

## Flash steam explained:

Flash steam occurs when steam, at a high pressure, condenses into water and passes into an environment at a lower pressure.

When we consider an indirect steam-using process at a food manufacturing site, the high pressure steam gives off its energy, turns into liquid form, known as condensate and is then passed into a vented return system which is typically at atmospheric pressure.

Using a typical steam-heated process as an example: steam at 8 bar g exists at 175°C, water at 0 bar g (atmospheric pressure) can only exist at 100°C, meaning that the extra 75°C of heat energy becomes an excess. This excess energy has a 're-boiling' effect on the water at 100°C, turning a portion of it back into steam at 0 bar g pressure. Using steam tables, we can calculate that 14% of the condensate generated at 8 bar g will be converted into flash steam!



# What are those plumes?

You may have visible plumes of steam emitting from your plant and processes as you read this e-guide.

These steam plumes represent energy and water loss, plus other consequences we'll explore later on.

Have you ever wondered if these plumes could be avoided? Steam loss can be classified as either controllable or unavoidable.

**Controllable losses** – from leaking steam traps or safety valves where live steam is entering the condensate system.

**Unavoidable losses** – otherwise known as flash steam, is a by-product of steam using processes where condensate is generated and can be recovered.



# Identifying and dealing with controllable losses

Controllable losses that contribute to visible steam plumes can be identified as having three sources, where live steam is able to pass directly to atmosphere:

## PASSING STEAM TRAPS

Leaking steam traps in your process will not cause issues such as longer processing times, but they will cause unnecessary and significant energy and water losses.

A steam system without a proactive steam trap maintenance plan can have between 5-20% of steam traps failed and losing steam to atmosphere.

**TOP TIP:** Schedule regular professional steam trap surveys. It's the most efficient way to identify failed steam traps quickly.

## LEAKING SAFETY VALVES

Safety relief valves protect your process from experiencing pressures that are beyond safe limits. These high tolerance valves release pressure from your system when required and reseal after a safe pressure has been met.

A leaking safety relief valve is a common sight, especially where it has an incorrect setting or where the system pressure has been raised to speed up the processing time.

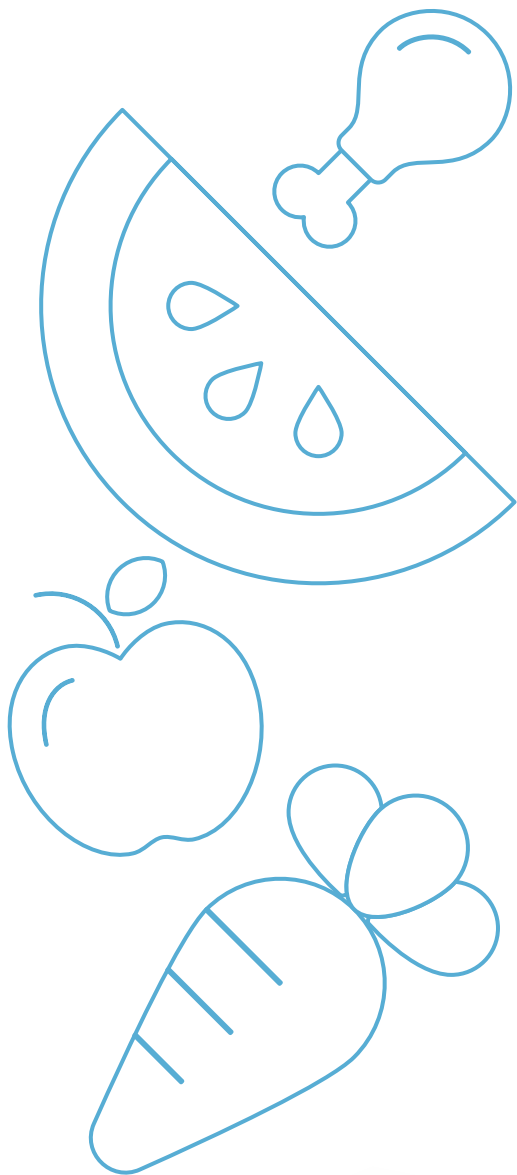
You can quickly inspect each valve to ensure it is appropriate for your process. If it is leaking, it should be replaced to help reduce visible plant emissions.

**TOP TIP:** It is mandatory to keep a record of all safety devices installed within your steam system.

## OTHER REPAIRABLE LEAKS

Your visible steam emissions could be a symptom of plant-equipment leaking, such as a passing control valve or a pin-hole or crack in a heat transfer surface.

**TOP TIP:** Continuous monitoring can help you avoid further energy and water losses by detecting the early failure of key plant and steam-using equipment. The use of Steam Tight control valves can ensure a process is free of steam leaks due to wear and tear.



## Flash steam in food manufacturing

All indirect\* steam using applications in your food manufacturing process will generate flash steam as an unavoidable by-product.

If your process uses large quantities of high-temperature steam, such as steam jacketed vessels, retorts, jacketed or rotary dryers, you will produce more flash steam. Lower intensity processes, such as air-drying, generate less flash steam.

The great news is that this lost energy and water can be captured and recycled.

Flash steam can be captured to help pre-heat a fluid for another process, such as water used as a hot liquor, that would otherwise be heated from another energy source.

The water from the plume is condensed and captured within the condensate system, reducing the need for make-up water in the boiler.

When considering the amount of available energy and water for capture from your process, take into account the different operating temperatures, operating pressures, and equipment operating time.

Your steam system always needs hot water for either process or cleaning, meaning that a heat sink\*\* is often closer than you think!

\*indirect steam using processes do not involve the steam coming into contact with the product. In these cases, the steam is transferring heat to a product through a heating surface, such as a steam jacketed vessel or heat exchanger.

\*\*a heat sink is a fluid medium into which the recovered heat energy is transferred.

# Why should you consider reducing your visible emissions and recovering flash steam?

Click on the numbers for more information.



# Your Checklist ✓✓✓

- Read e-guide
- Listen to the Talking Steam Podcasts
- Speak to your local steam engineer
- Book a steam trap survey
- Identify your unavoidable losses

You can reclaim your lost energy with heat energy recovery solutions from Spirax Sarco.

If you need further information, please contact the team at [talking.steam@spiraxsarco.com](mailto:talking.steam@spiraxsarco.com) and subscribe to our [Talking Steam: Focus on Food](#) Podcast.





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