

# A specifiers guide to steam traps for chemical-free and pure steam applications

What to look for and how to make the right choice for your pharmaceutical plant

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# Foreword

**As a highly regulated industry, there is no room for error in pharmaceutical manufacturing. By correctly matching components within your steam system to your applications, you can be rest assured that you are maintaining a safe and validated process whilst also safeguarding the integrity of your final product.**

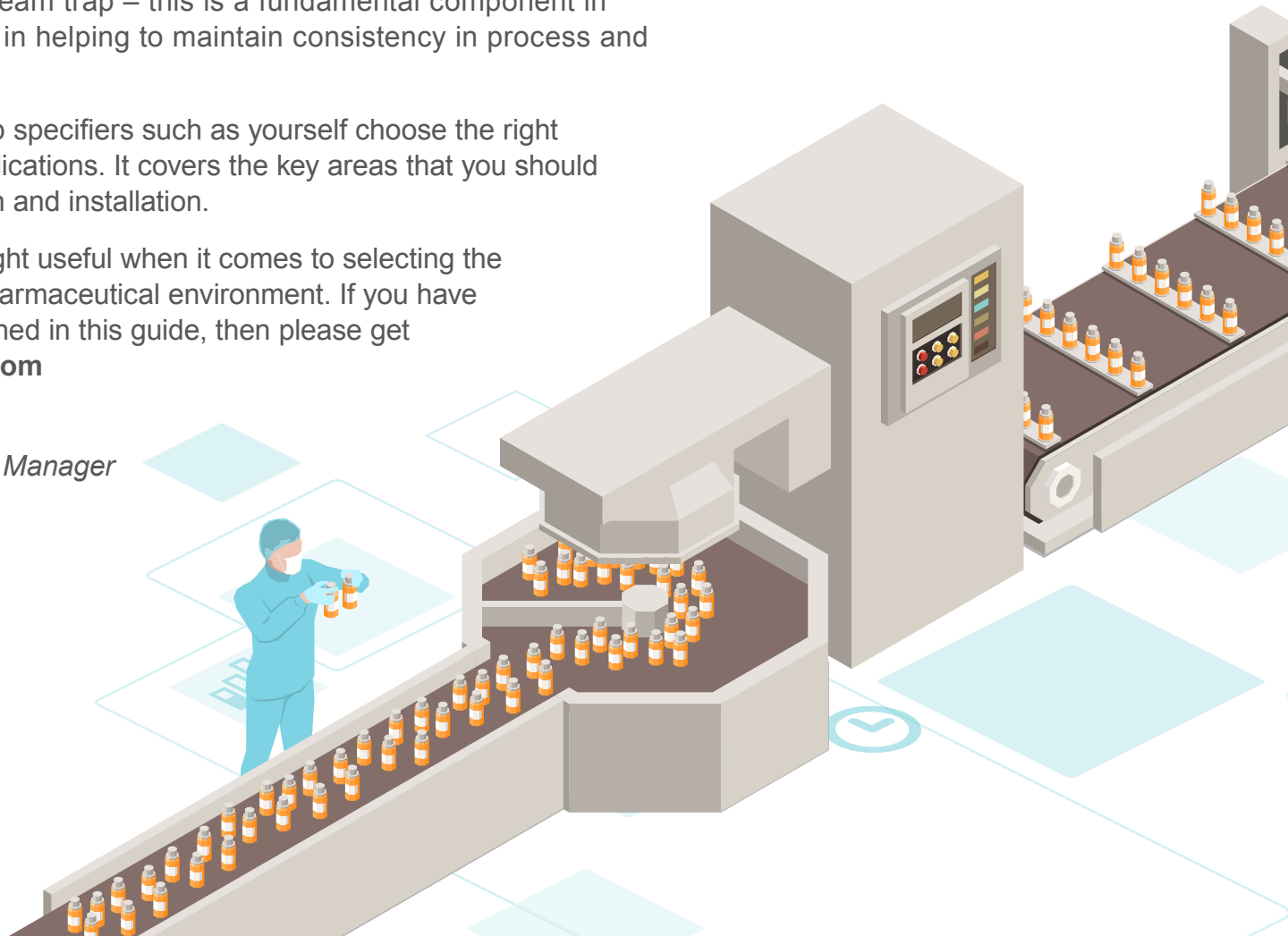
Take for instance the choice of steam trap – this is a fundamental component in your steam system, which is vital in helping to maintain consistency in process and product quality.

This guide has been written to help specifiers such as yourself choose the right steam trap for pharmaceutical applications. It covers the key areas that you should consider, including material, design and installation.

It is my hope that you find this insight useful when it comes to selecting the steam traps most suited to your pharmaceutical environment. If you have any questions about topics mentioned in this guide, then please get in touch: [hello@uk.spiraxsarco.com](mailto:hello@uk.spiraxsarco.com)



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## What is a steam trap?

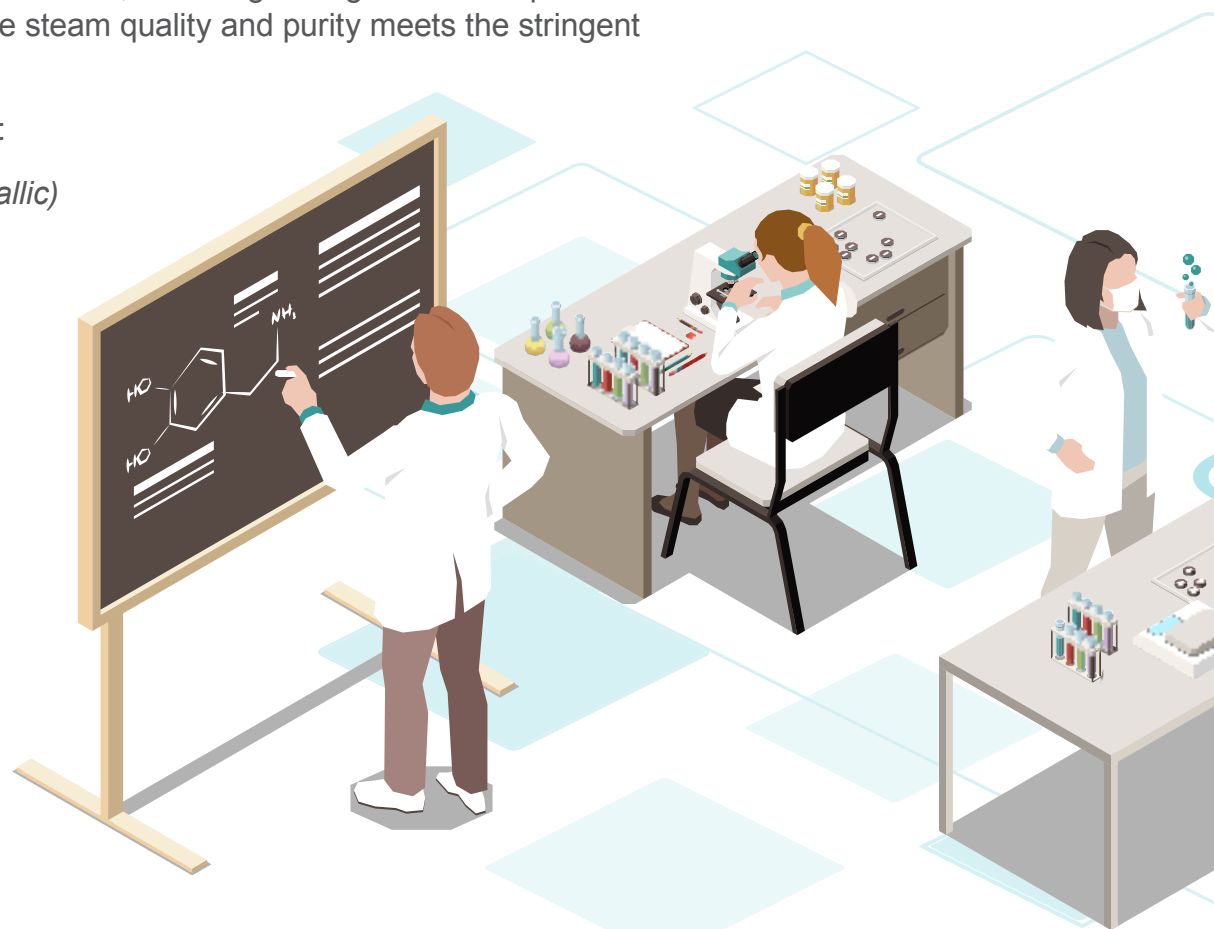
When choosing and purchasing your steam traps, it's important to understand what they do, and why matching the type of steam trap to an application is a crucial consideration. This is of particular importance as there are different steam traps available with each type designed to suit certain applications.

Steam traps are automatic valves that release condensate, air and other non-condensable gasses (NCGs) from the steam pipework or process without letting the steam escape. With various methods of operation, material options and surface finishes available, choosing the right steam trap in a pharmaceutical application is vital to ensure that the steam quality and purity meets the stringent requirements of the industry.

The three main steam trap operating principles are:

- *Thermostatic (e.g. balanced pressure or bimetallic)*
- *Thermodynamic*
- *Mechanical (e.g. ball float or inverted bucket)*

For chemical-free and pure steam applications such as mains drainage and Clean-In-Place (CIP)/ Sterilise-In-Place (SIP) of vessels, reactors and process lines, it is common to use a population of balanced pressure thermostatic steam traps.



## Why use balanced pressure traps for chemical-free and pure applications?

Balanced pressure traps are ideally suited to pharmaceutical environments because they are designed to be 'free draining'. This ensures that condensate is allowed to drain from the trap under all conditions, without retaining condensate in the body of the trap (as found with mechanical traps such as float-type and inverted buckets).

The flow path within a thermodynamic trap does not allow condensate to drain freely and should not be used on critical applications.

The balanced pressure trap really is the ideal solution for these applications and is best suited to meet the requirements of ASME BPE (SD-4.2.2 Clean/Pure Steam Distribution System and SD-3.12 Steam Traps) 2019.





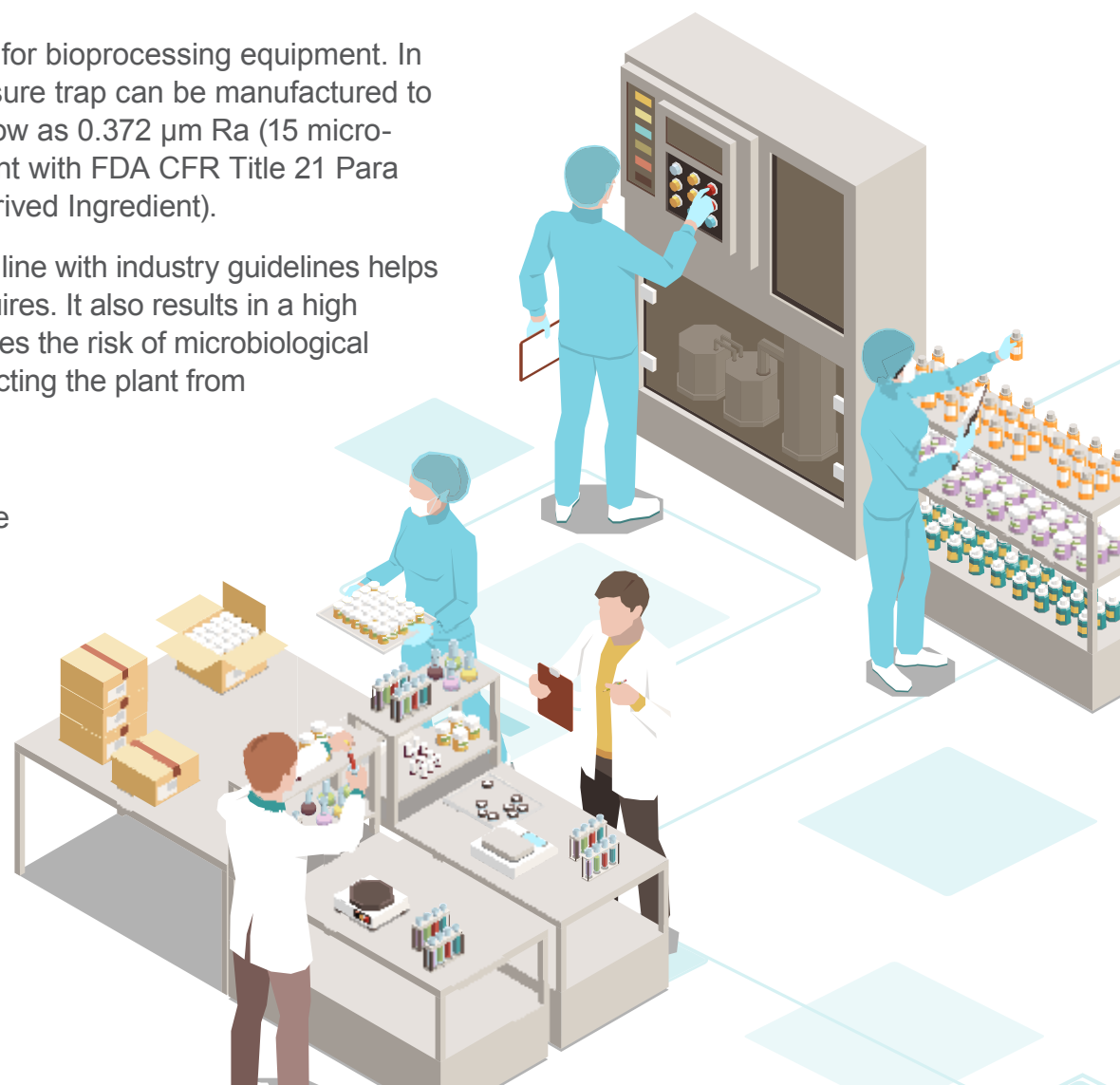
## Material

**The material used to construct the steam trap is critically important. For example, 316L stainless steel with a high-quality surface finish ensures compliance with industry guidelines.**

ASME BPE specifies the surface finish requirements for bioprocessing equipment. In line with this, the simple design of the balanced pressure trap can be manufactured to an internal finish of  $0.6 \mu\text{m Ra}$  (25 micro-inch) or as low as  $0.372 \mu\text{m Ra}$  (15 micro-inch). As for seals in the trap, they should be compliant with FDA CFR Title 21 Para 177.1550, USP Class VI and be ADI Free (Animal Derived Ingredient).

The high specification of material and surface finish in line with industry guidelines helps you towards achieving the steam purity your plant requires. It also results in a high degree of corrosion resistance, which not only minimises the risk of microbiological growth but also prolongs the life of the product – protecting the plant from unplanned downtime.

Manufactured by Spirax Sarco for such applications, the BT6-B is available with fully traceable parts and the associated 3.1 material certification for all wetted components, in line with the stringent requirements of the pharmaceutical industry.

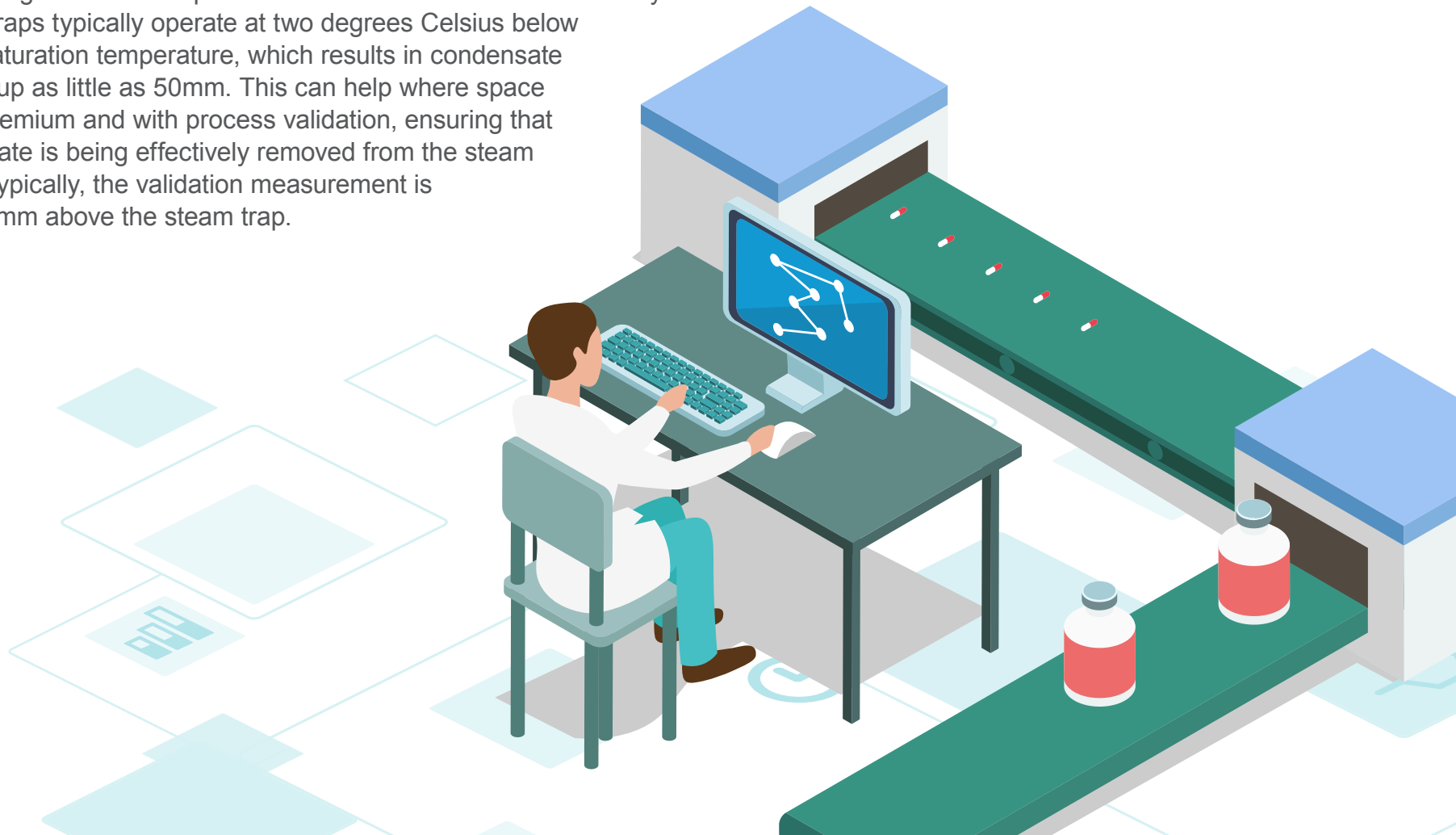




## Cooling leg

In order to keep the required cooling leg as short as possible, the steam trap should operate close to steam temperature. This is also important to achieve process validation, as it ensures that minimal condensate backs up prior to the trap inlet.

The latest generation of Spirax Sarco BT6-B Thermostatic Sanitary Steam Traps typically operate at two degrees Celsius below steam saturation temperature, which results in condensate backing up as little as 50mm. This can help where space is at a premium and with process validation, ensuring that condensate is being effectively removed from the steam space. Typically, the validation measurement is 150-200mm above the steam trap.





# Your steam trap checklist

To recap, steam traps for the specific use on chemical-free and pure steam pharmaceutical applications should address the following:

- ✓ **Manufactured from hygienic 316L stainless steel and ASME BPE compliant throughout**
- ✓ **Designed and manufactured to help maintain steam quality that complies with European requirements and USP guidelines.**
- ✓ **Free-draining design**
- ✓ **Full material traceability and 3.1 certification on all wetted components**
- ✓ **Minimal cooling leg**



## Conclusion

Matching the right steam trap type to an application is crucial. It may appear to be a small part of the steam system, but steam traps certainly have a key role to play when it comes to running a steam system safely and at peak operational efficiency.

**For more information or advice, get in touch with the Spirax Sarco team at [hello@uk.spiraxsarco.com](mailto:hello@uk.spiraxsarco.com) or call us on 01242 521361.**

We believe organisations like yours should be able to guarantee the traceability of all chemical free and pure steam products with the added ease of sourcing from a single point of supply.

Our state of the art facility ensures that our high specification products are assembled in an ISO 7 Cleanroom to eliminate the risk of cross contamination of ferrous and non-ferrous metals.

**Take a tour at [sxscom.uk/cleanroomtour](https://sxscom.uk/cleanroomtour)**

