

# Guide to Hygienic Drainage Performance

## Introduction

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The strictest levels of hygiene are required in food and drink manufacturing applications and is considered one of the most *challenging environments* to design. The fundamental reason for applying hygienic design principles in food factories is to prevent cross contamination of food products. Therefore, careful attention must be paid to the infrastructure of a food and drink processing facility but more specifically to the drainage of waste.

There is increased importance placed on food hygiene in food manufacturing facilities in recent months with the recent *Covid-19* outbreak across a number of food factories in the UK. These sites have been forced to close to enable deep cleaning and placing a strain on employee operations as well as the safety of the consumer.

*Listeria* is always high on the agenda for food manufacturers too. Drainage must be kept spotless as listeria can easily be spread throughout plants by walking over contaminated drain grates and the spreading of virus particles. The drain cleaning process also means pressurised water blasts listeria onto equipment and flooded drains can also get clogged up during the cleaning process. Listeria outbreaks are commonly linked to food factories and often found in the floor and drainage areas of the plant.

## Importance of Stainless Steel

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All hygienic drainage should also be specified in high quality *grade 304 or 316 stainless steel* and is determined by the environment and cleaning process. The key reason for this is the smooth, protective and solid chromium oxide layer on top. This ensures the stainless steel is *corrosion resistant* and the base material does not corrode when in the contact with food and other environmental factors. In addition, its easy to clean so germs and bacteria cannot attack and raises the hygiene levels within the plant.

Surface finish and condition is critical in the successful application of stainless steel, the smooth surface promotes good cleaning and prevents the risk of corrosion. Quite simply there is no better material than *stainless steel* for contact with food however attention must also be paid to the drainage specification. This *whitepaper* will highlight the best practice in designing and maintaining hygienic environments to ensure optimum performance.

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Aspen Stainless for hygienic design,  
manufacture and installation





## Drainage by Design

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An expertly fitted drainage system will have a positive impact on the entire factory by boosting the overall *hygienic performance*. This includes improvement in employee health & safety, operational costs as well as consumer safety. If drainage design is treated as an afterthought during the project lifecycle' forcing the client to rectify the drainage at a later stage. This process could involve removing the production equipment, flooring and could disrupt the entire manufacturing process.

## Application Checklist

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The below checklist will help to ensure the drainage is fit for purpose:

<b>1. Application areas</b>
<ul style="list-style-type: none"><li>• Hygiene requirements. What are the risks?</li><li>• Layout of factory and equipment areas - full plans of finished floor</li><li>• Types of fluid &amp; debris that needs to be drained</li></ul>
<b>2. Grating requirements</b>
<ul style="list-style-type: none"><li>• Loading requirements, traffic including fork lift truck, pallet trucks etc.</li><li>• Anti- slippage and flow rates</li></ul>
<b>3. Maximum in the location in litres per second = room loadings</b>
<ul style="list-style-type: none"><li>• 3-5 litres per second requires 110mm diameter outlet</li><li>• 5-9 litres per second requires 158mm diameter outlets</li></ul>
<b>4. Cleaning and installation</b>
<ul style="list-style-type: none"><li>• Floor connections/drainage</li><li>• Cleaning materials used and concentrations</li></ul>
<b>5. Plant hydraulic capacity</b>
<ul style="list-style-type: none"><li>• Pipe to direct to drainage point where possible</li></ul>
<b>6. Maintenance</b>
<b>7. Future protection</b>
<b>8. Project management</b>



## Best Hygiene Practice

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Drainage systems should be designed in compliance with *EHEDG (European Hygienic Engineering & Design Group)* by supporting safe hygienic engineering and design in all aspects of food manufacture. Aspen Stainless complies fully with this standard.

### Hygienic design as outlined by EHEDG

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- Sharp corners are difficult to clean, especially if they're situated at a right angle or bend in the drainage. It's harder to get into a corner and to make contact with the entire surface to be cleaned effectively. Therefore *all* corners should be rounded.
- The equipment and pipework must be self-draining or drainable. These self-draining surfaces should always slope to one side with a minimum angle of 3°
- Small voids can harbour *bacteria* which can build up, therefore lap joints must be avoided at all costs.
- Ensure welds appear on flat areas only. This is because if your drainage is welded on a flat area then the manufacturer can ensure the weld is smoother and this eliminates small crevices, which again can harbour bacteria.
- Pickle passivated. The process used to restore the oxide layer that naturally occurs on stainless steel but is destroyed on welded joints and without the stainless steel creases. *EHEDG Doc. 18* states that its essential for drainage to be fully pickle passivated. This layer ensures the stainless steel is corrosion resistant and contributes to the longevity of the drainage.
- It's important to remember the floor starts with the drainage and poor drainage equals poor flooring

### Cleaning in food manufacturing

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The EHEDG states that '*product contact surfaces must be easy to clean, non-absorbent and not present toxicological hazard by leaching of substances into foodstuffs. All surfaces must be resistant to the product and to all detergents and disinfectants under the full range of operating conditions*' **Hygienic Design Principles. Third edition, March 2018**

Drainage systems need to be designed so they are easily cleaned and blend perfectly with the cleaning protocol of the food factory. Hygienically engineered drain channels can be easily washed to work practically with the environment. As you consider cleaning protocols think about the chemicals are in use. Are the chemicals going to be compatible with the drainage specified and are the chemicals also compatible with the flooring?

4.1 '*Cleanability is a very important hygiene requirement independent of cleaning methods e.g automatic or manual (including clean out-of-place (COP) Improperly or insufficiently cleaned equipment cannot be effectively disinfected*' **Hygienic Design Principles. Third edition, March 2018**

Remember to ensure cleaning practices have an important factor on hygiene, employee safety and operational cost too. Consider if your equipment is hygienically designed for a quick, easy and effective cleaning process.



## Flooring Compatibility

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The drainage needs to be compatible with the flooring to ensure a seamless connection. The reason is multiple issues can occur including cracks and elevation of floor plates that can compromise the performance of the drainage. The team at Aspen Stainless work alongside John Lord flooring to provide hygienic, durable flooring and drainage solutions to companies throughout the UK.

**John Lord Flooring** have been installing robust commercial and industrial flooring throughout the UK for over 100 years, specialising in commercial and resin flooring.

From initial consultation to completion, our technical sales team work closely with our installation teams to ensure a project is finished within budget, on time. The resin floor options available cater for all areas within a food and drink factory. All manufactured exclusively in house to **ISO 9001:2008** and **14001** and can be specified in a range of finishes depending on the requirements including smooth or anti-slip profiles, matt or gloss surfaces, rigid and flexible systems, and with formulas resistant to aggressive chemicals and high temperatures.

John Lord Flooring is the only resin flooring company to offer antimicrobial resin floor is ideal for environments that demand a high standard of hygiene. On a BioCote protected resin floor, 99.9% of bacteria cannot survive and makes it the perfect flooring product for industries such as food and drink manufacturing facilities.





## Sources:

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For further details on topics highlighted in this Whitepaper please visit the *EHEDG* for more information:

**EHEDG: Document 8** *'Hygienic design criteria' Third edition. March 2018*

**EHEDG Guideline 32** *'Materials of construction for equipment in contact with food'*

**EHEDG Document 44** *'Hygienic design principles for food factories'*

**EHEDG Document 45** *Cleaning validation in the food industry. General principles'*

**BS EN 1672-2: 2005+A1: 2009** *'Food processing machinery. Basic concepts. Hygiene requirements'*

## Websites:

[www.ehedg.org](http://www.ehedg.org) [https://www.maff.go.jp/e/policies/food\\_safety/](https://www.maff.go.jp/e/policies/food_safety/)

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## Hygienic Design, Manufacture and Installation

Aspen Stainless are leading experts in the manufacture and installation of *bespoke* stainless-steel equipment to meet the increasingly stringent demands of hygienic performance. Aspen have supplied hygienic bespoke solutions to a number key applications including food and drink processing plants, commercial kitchens, hospitality, leisure sectors and many more.

Our dedicated team has the ability to service the largest projects within limited time programmes across the UK and overseas. All projects are overseen by our highly-experienced, dedicated project management team, ensuring customer expectations are continually met.

For further advice and guidance on Aspen drainage please visit [aspen.eu.com](http://aspen.eu.com)

You can also contact the **Aspen Stainless Technical Sales team** on. **0115 986 6321**

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