

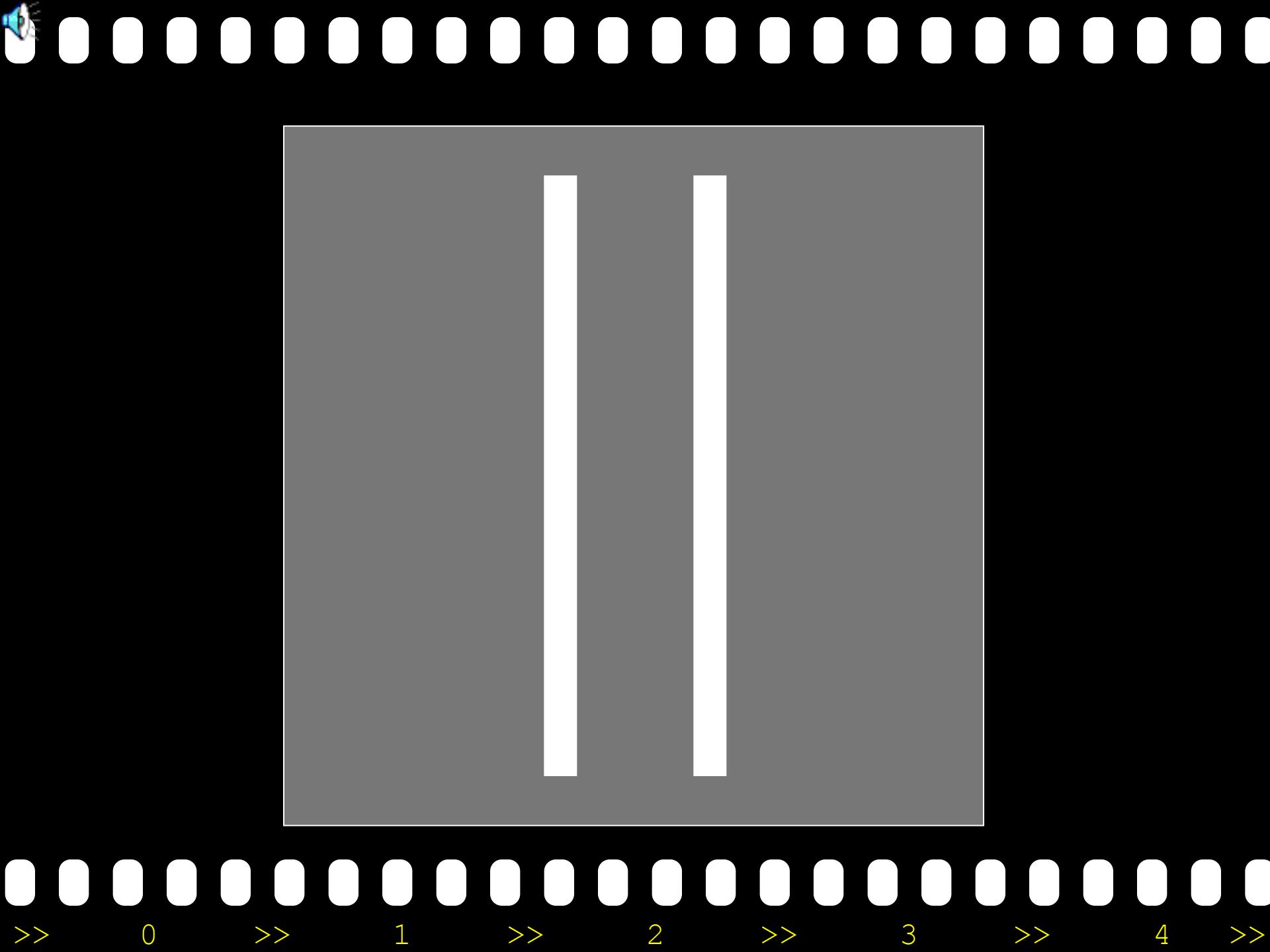








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# Hygiene by Design



**Building Drainage**

# Drainage!

**Raising the profile...**

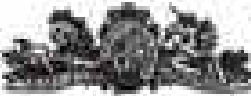






# Why hygiene?



THE  TIMES

Contaminated  
sausages '**kill 15  
people**' in Denmark  
listeria outbreak

# Why Drainage?



**Because it matters...**  
**and there is a link!**





**Food Control 29  
(2013) 91-97**

“We report the detection of Listeria in 34 dairy plants. In total, 547 of food, product contact surface and floor drain samples were collected along the product lines. Nineteen cheese factories (55.8%) were contaminated by Listeria.

Listeria was found in 6.8% of food samples, 11.3% of product contact surfaces and **40.6% of floor drains.”**

# Food Safety News

Breaking news for everyone's consumption

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## K-State Food Safety Professor: Don't Take Chances With Listeria

BY NEWS DESK

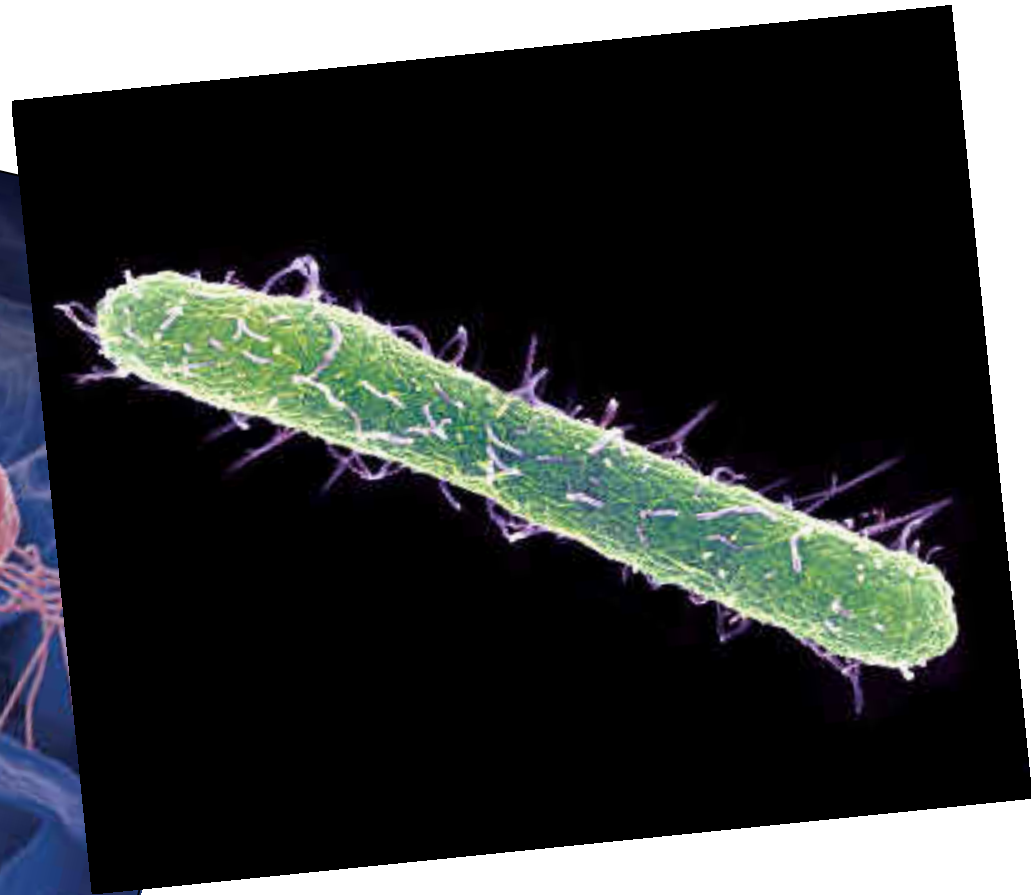
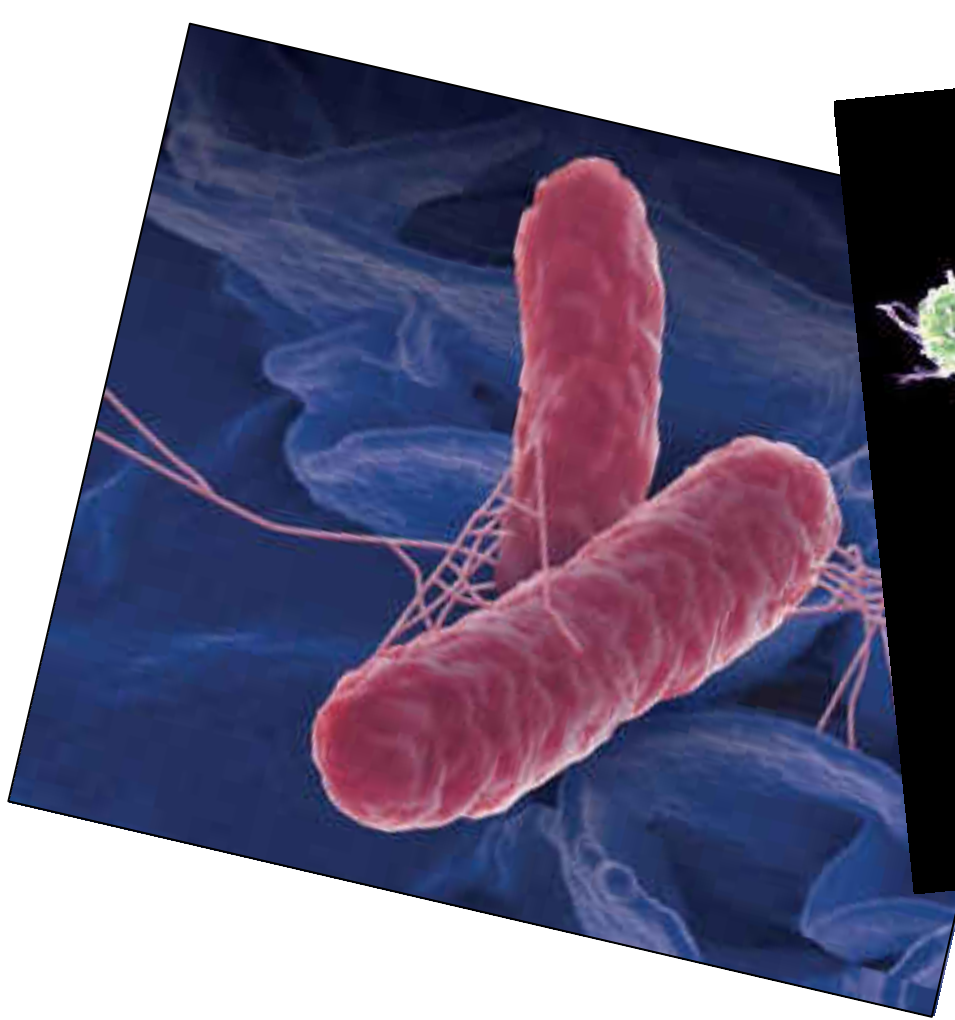
Listeria contamination in just two months, and a Kansas State University food safety specialist says the bacteria typically not associated with the place. Because it survives in cold, wet environments, it can be found in drains or other areas of condensation within a plant.

"Listeria is a group of bacteria that can survive in just two months, and a Kansas State University food safety specialist and professor of food science says the bacteria typically not associated with the place. Because it survives in cold, wet environments, it can be found in drains or other areas of condensation within a plant."

Fadi Aramouni, a food safety specialist and professor of food science, says the bacteria typically not associated with the place. Because it survives in cold, wet environments, it can be found in drains or other areas of condensation within a plant.

This bacterium can be deadly

Don't take chances.



# Listeria & drains...

- 10,000 environmental swab samples in high risk for Listeria
- Levels
  - Cleaning equipment 47%
  - Drains 23%
  - Floors 17%
  - Food production surfaces 2%



**“Floor drains in food processing facilities are a particularly important niche for the persistence of listeriae and can be a point of contamination in the processing plant environment and possibly in food products”**

**“Drainage is a critical component affecting the hygienic performance of food production. Effective drainage helps mitigate hazards from the external environment and is central to the safe and hygienic operation internally”**

**Applied and Environmental Microbiology Volume 72**



# Drain Interface



The cause of  
factory  
closure...!

Campden BRI   
food and drink innovation

**BRITISH STANDARD**

---

**BS EN ISO  
22000:2005**

**Food safety  
management systems —  
Requirements for any  
organization in the food  
chain**



# Pre-Requisite Programme

- **The implementation of good hygiene and manufacturing practice:**
  - Provide basic environmental and operating conditions
  - Underpin the HACCP system
  - Must be in place and fully operational
  - Is required for the production of safe, wholesome food.

## Hygienic Infrastructure

1. Hygienic design of factories
2. Factory Site
3. **Factory Buildings (inc. Drains)**
4. Segregation
5. Process Lines
6. Design of equipment and utensils
7. Personal hygiene
8. Transport

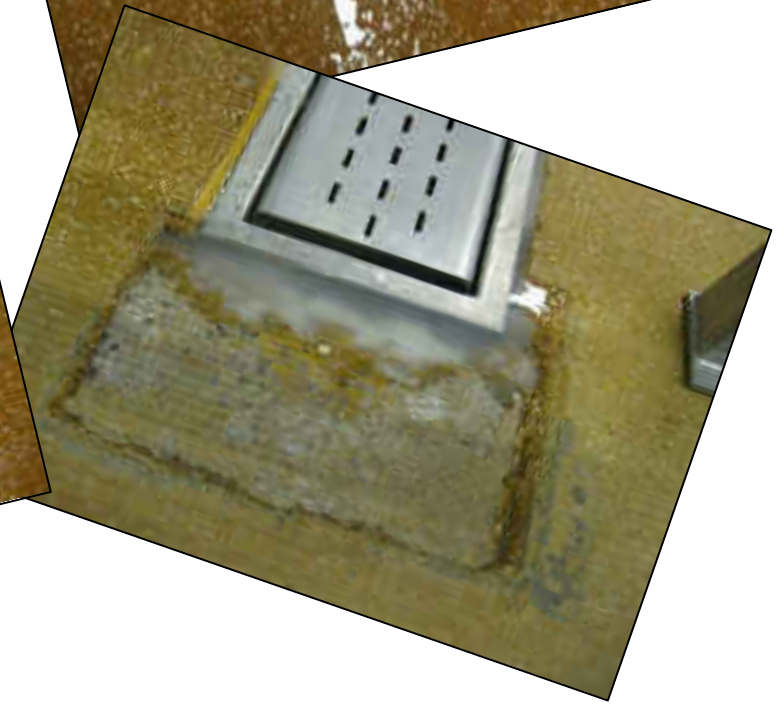
## Hygienic Practices

1. Maintenance
2. Personal Hygiene
3. **Cleaning & Disinfection**
4. Allergen control
5. Environmental sampling methods
6. Pest control
7. Foreign body control
8. Waste disposal









# Design Issues...

- Area of application
  - Hygiene requirement
  - Loading issues
  - Use (fluid type)
- Grating requirements
- Capacity (Hydraulic)
- Installation & Cleaning
  - Thermal shock
  - Chemical attack
- **Change of use | Durability | Future Proof**

Understand the relative importance of the issues to make the correct specification...



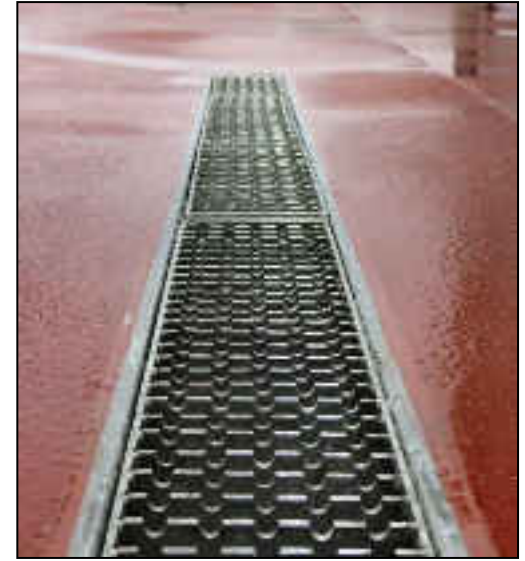


# Functionality...

- Interception
- Conveyance
- Barrier

The choice of drainage influences the design of the floor....

- » Channels tend to lead to simpler fall design.
- » Gullies tend to require more complex fall design.
- » Impacts floor design and functionality.



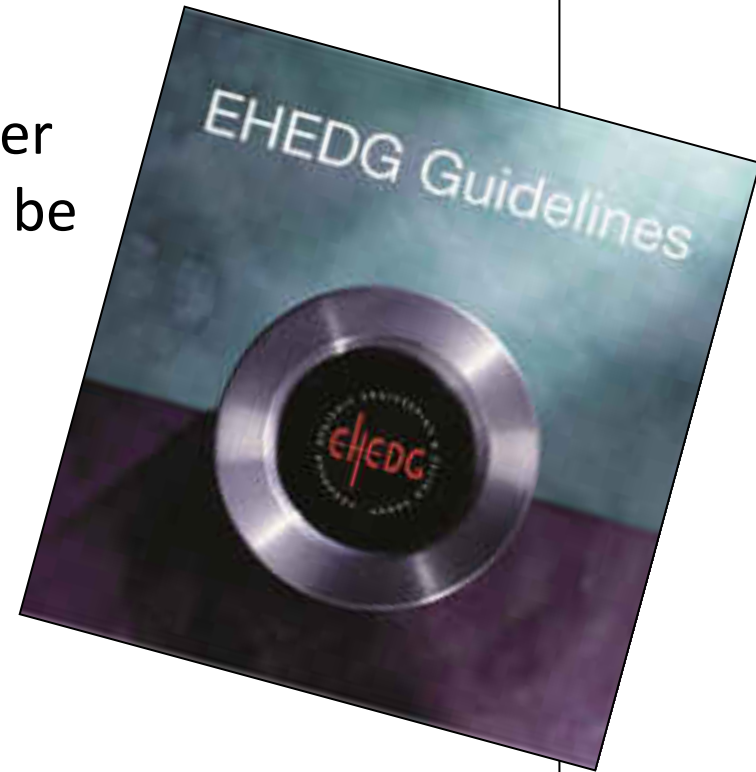


# European Hygienic Design Engineering Group

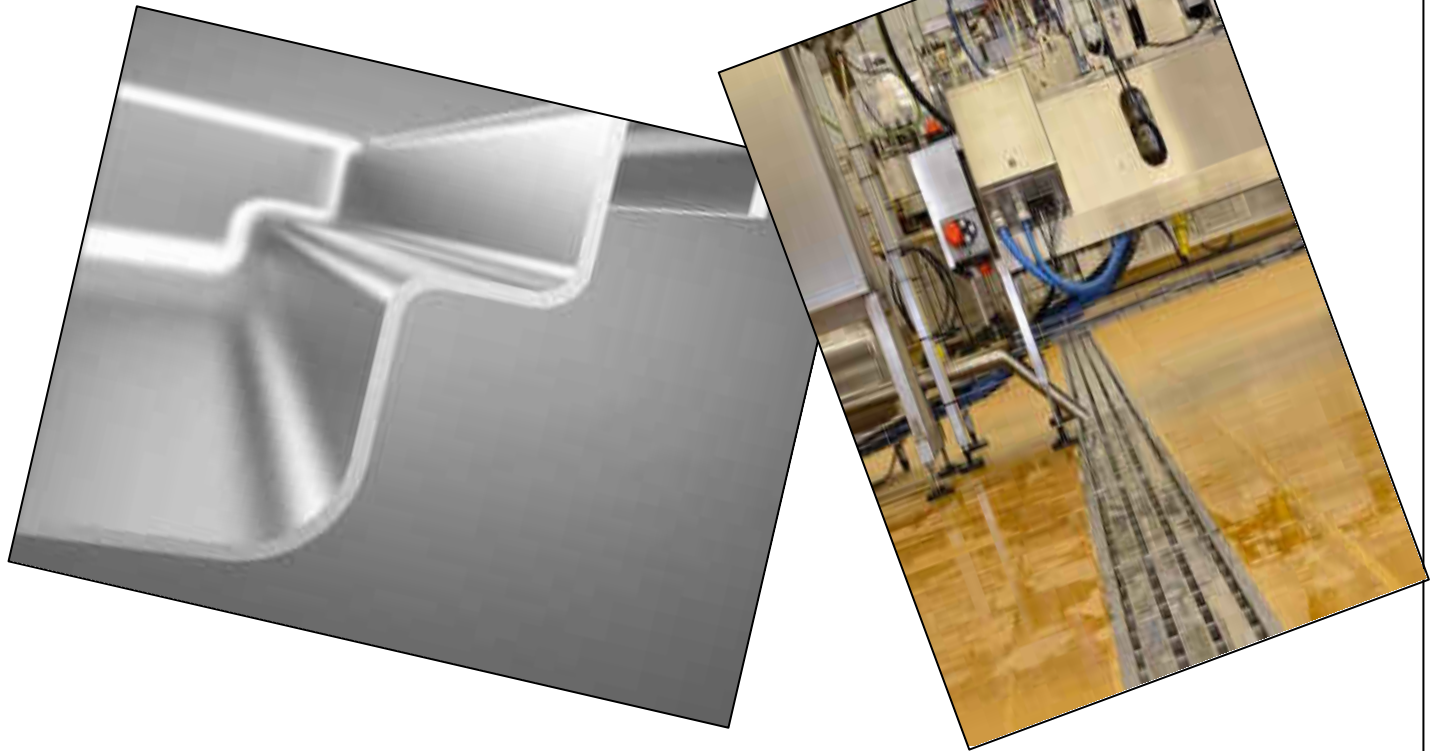


2015

- Guidance documents now number **44** with the latest information to be launched
- “Hygienic Principles for Food Factories”

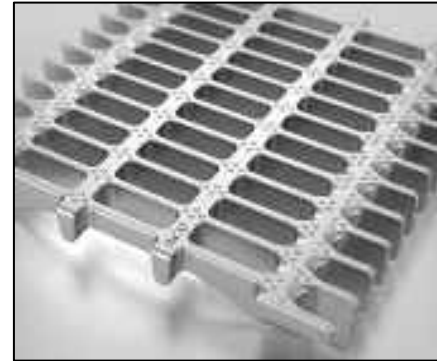
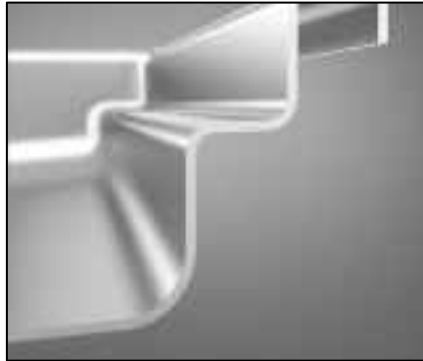


Success is in the detail....



# Helping Hygiene | Drainage

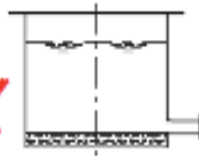
- **Apply standards reserved for food contact surfaces  
EN 1672 and EN ISO 14159 to the drainage design.**



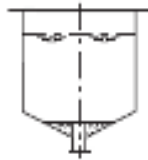


**Avoid**

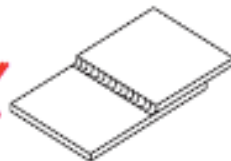
Hygiene risk according to  
BS EN 1672 and BS EN ISO 14159



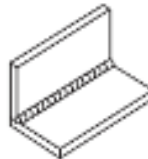
Not drainable design



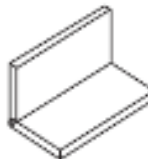
Not drainable design



Continuously welded lap joint

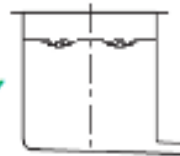


Welded in corners

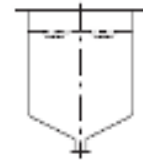


Welded in corners

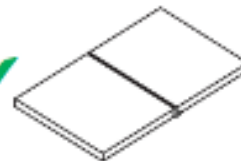
Acceptable according to  
BS EN 1672 and BS EN ISO 14159



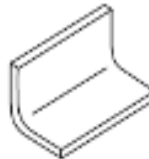
Drainable design



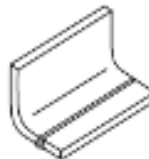
Drainable design



Continuously welded butt



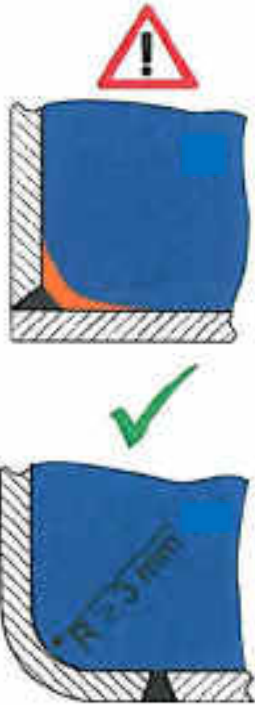
Round internal corner



Welded in smooth area

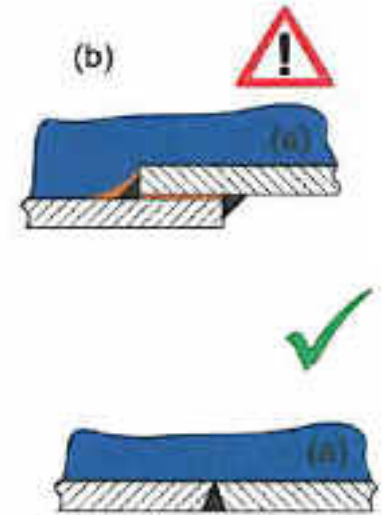
**Recommend**

# Helping Hygiene | Drainage



Rounded  
component  
features  
generated using  
advanced deep-  
drawn metal cold  
forming  
techniques

# Helping Hygiene | Drainage



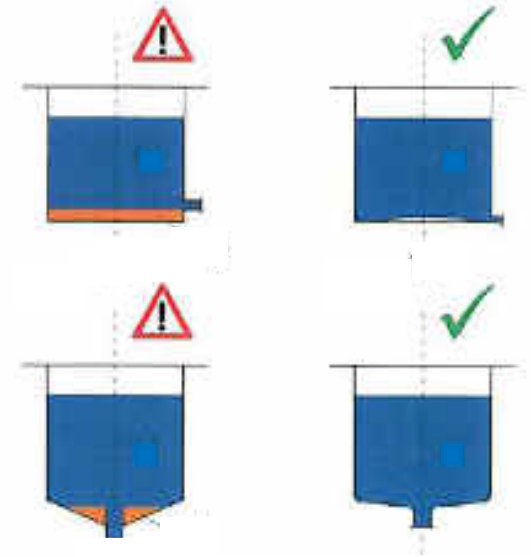
Deep drawn forming used to minimise welded joints

Lapped joints eliminated using advanced robotic automated welding techniques



# Helping Hygiene | Drainage

Good gully design  
eliminates  
residual standing  
wastewater in  
body





# Helping Hygiene | Design

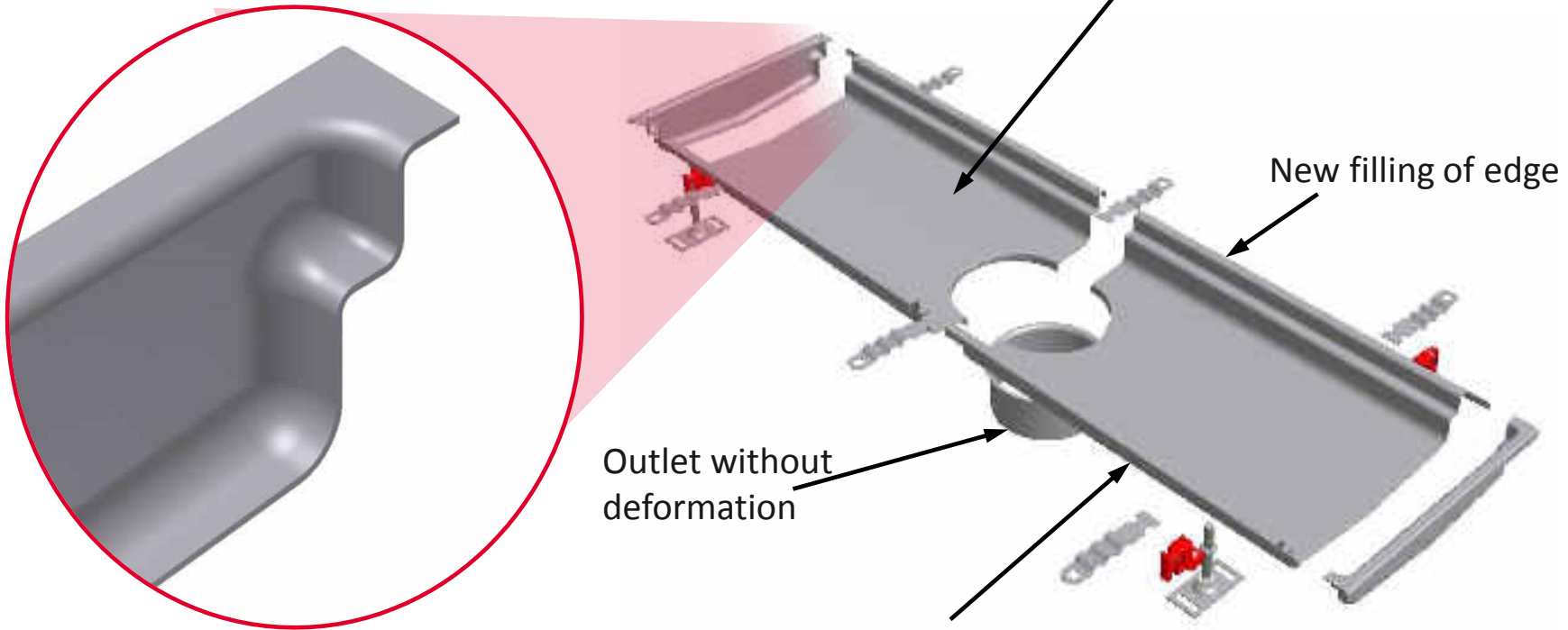
Round corners  
minimal 3 mm

Minimal slope 1%  
longitudinal and cross  
on all areas

New filling of edge

Outlet without  
deformation

Reinforced bottom  
for width > 300mm



# Helping Hygiene | Pickle Passivation



**BS EN 2516 - Passivation of Corrosion Resisting Steels and Decontamination of Nickel Base Alloys**

# Helping Hygiene | Health & Safety



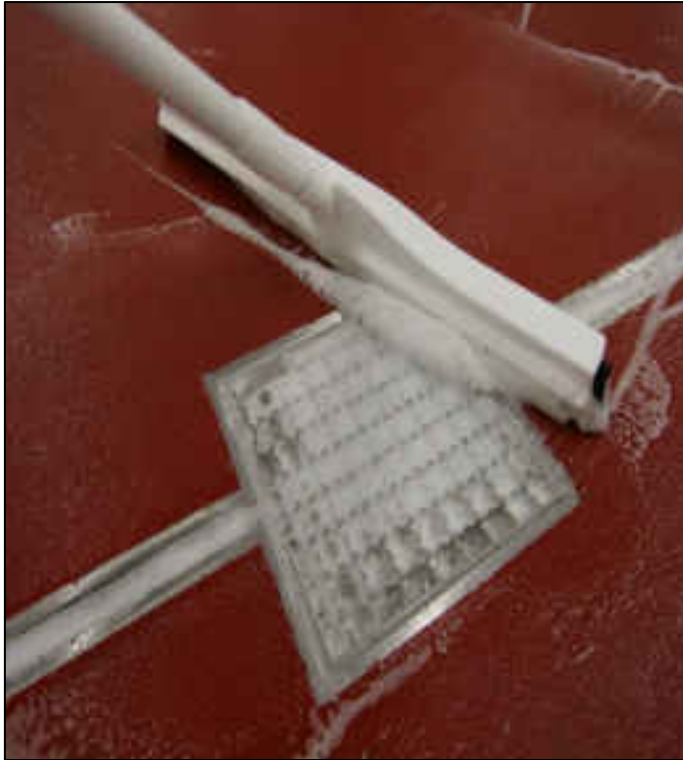
- ☑ Reduce the risk of slips by your operatives by removing excess fluid from the floors
- ☑ Correctly specified drainage will reduce the risk of trips on drains that are bent or rocking
- ☑ Ensure grates can be removed without cutting your hands

# Helping Hygiene | Operational Cost



- ☑ Make drainage easy to access and clean and it will get done and not ignored
- ☑ Well planned drainage will reduce your cleaning time and your cleanings costs
- ☑ Properly cleaned drainage will reduce the risk of poor hygiene

# Helping Hygiene | Specification



- ✓ Choosing the right steel
- ✓ Welding Process
- ✓ Pickle Passivation
- ✓ Product design considerations
- ✓ PAS99 Certification
- ✓ Food industry knowledge
- ✓ Operational considerations

# Hygiene by Design

**Drain**

**Clean**

**PROCESS**

**Floor**









# Hygiene by Design | Key Messages

- ☑ Ignore drainage and take a risk!
- ☑ Drainage is a fundamental part of HACCP / PRP
- ☑ There is no easy solution when it goes wrong! Plan for drainage!
- ☑ The role & **specification** drainage is hugely important
- ☑ A good outcome requires linkage with **floors** and **cleaning**
- ☑ Remember to think about **drainage first** before its too late!





Institute of  
**Food Science**  
**+ Technology** **ifst**



Hygiene by Design | IFST | February 2016

