THE HYGIENIC DESIGN OF FOOD INDUSTRY CLEANING BRUSHES
WHO AM I?

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HYGIENIC DESIGN

What does it mean?
How easy it is to clean
Cleanability
The ability to clean something easily

Two things to consider
Hygienic design of the equipment
Materials of construction
EUROPEAN HYGIENIC ENGINEERING DESIGN GROUP (EHEDG)

Independent, not-for-profit organisation
Academic and industry volunteers
‘..promotion of safe food by improving hygienic engineering & design in all aspects of food manufacture.’
Guidance
Training
Certification
BENEFITS OF HYGIENIC DESIGN

Equipment and facilities that are of good hygienic design

- are quicker and easier to clean
- minimise the risk of product cross-contamination (microbes, allergens, foreign bodies, food residues)
- maximise food safety and quality
- Reduce the risk of expensive product rejection or recall
- minimise food waste

= cost benefits and business protection
A FEW THINGS YOU MIGHT NOT KNOW ABOUT CLEANING EQUIPMENT

Cleaning equipment has been shown to be a major source and vector of cross-contamination

47% of cleaning equipment tested was positive for Listeria (MAFF/CBRI)

FSSC 22000

11.2 Cleaning and sanitising agents and tools:
‘Tools and equipment shall be of hygienic design…..

BRCv7 Global Standard for Food Safety
4.11.6. ‘cleaning equipment should be hygienically designed’

Some food industry brushware is not food contact compliant

There is little guidance on hygienically designed cleaning equipment
HYGIENIC DESIGN OF BRUSHWARE
UV LOTION INVESTIGATION METHOD

Usually used to train food operatives in good hand washing techniques

UV lotion

Hands washed and dried using the prescribed method

Hands inspected under UV light to visualise remaining ‘contamination’

Applied and rubbed into the hands
‘CONTAMINATION’ OF BRUSHWARE
‘CONTAMINATION’ SEEN UNDER UV LIGHT
DECONTAMINATION PROCEDURE
‘CONTAMINATION’ REMAINING
HYGIENIC DESIGN INVESTIGATIONS
FUSED BRUSHWARE
Poor surface finish
EHEDG recommend an $R_a$ of less than 0.8\,\mu m as cleanable.
HYGIENIC DESIGN INVESTIGATIONS
RESIN SET BRUSHWARE

Courtesy of CampdenBRI
HYGIENIC DESIGN INVESTIGATIONS
RESIN SET BRUSHWARE

Channel, potential contamination trap

Courtesy of CampdenBRI
BROWNES ASSESSMENT METHOD
‘CONTAMINATION’ REMAINING

Trapped contamination, after dishwashing
MATERIALS OF CONSTRUCTION

In the EU plastic equipment and utensils that is likely to come into contact with food or food contact surfaces must comply with EU food contact regulations:

→ EC Regulation Nos. 10/2011 and 1935/2004 and subsequent amendments and updates

→ These regulations require,
  → Migration tests
  → Declarations of Compliance

*FDA compliance alone is NOT sufficient within the EU

EHEDG Guideline 32 “Materials of construction for equipment in contact with food” (2005)
EU FOOD CONTACT COMPLIANCE

Two component resin

The resin-set items are made by a two component molding system. The hardened resin archives adhesion to most plastics materials, and the resin ensure single filaments to pulling out and the method inhibits the accumulation of dirt or moisture in the tuft holes.

The two component resin is not approved for directly contact with food.
**Conclusion:** All brushware investigated have hygienic design issues

Application of EHEDG/3A *hygienic design principles to future cleaning tool development:

- Absence of crevices and contamination traps
- Smooth surface finish
- Easy to clean (and dry)
- Made of food safe materials
- Well constructed
ULTRA SAFE TECHNOLOGY
BRUSHWARE

• Fully moulded construction
• Reduced risk of foreign bodies;
  • No resin
  • No metal staples
  • Reduced risk of bristle loss
• No drilled holes
• No sharp internal angles
• Smooth surface finish (<0.8 Rₐ)
• Easier to clean and dry
• Made entirely of food contact approved materials (EU & FDA)
• Fully coloured
• Fully tested and documented
BRISTLE FIXATION

- Brush block
- Metal staple
- Resin

Dimensions:
- 10 mm
- 6-8 mm
- 2 mm
TOP 5 TAKE HOME MESSAGES

1. Cleaning equipment can be a major source and vector of contamination.

2. The hygienic design of cleaning equipment is a requirement of FSSC 22000 and BRCv7

3. Very few cleaning tools are made with hygienic design in mind and there is little guidance on this subject.

4. Cleaning equipment and utensils likely to come into contact with food or food contact surfaces must be appropriately food contact approved

5. Choose equipment that is appropriately hygienic for the job (based on risk assessment)
THE FUTURE..?

Guidance, standards, certification, training on food industry cleaning equipment, food contact utensils?

*EHEDG/3A Guidance & Certification*?
Further information about hygienically designed cleaning tools

- Vikan White Paper
- Journal of Hygienic Engineering & Design (JHED) 2015
- EHEDG Handbook of Hygiene Control in the Food Industry, 2nd ed, 2016
- EHEDG Yearbook 2017/18
- www.vikan.com/ust/int
THANK YOU FOR YOUR ATTENTION

ANY QUESTIONS?
HYGIENE SEMINAR PROGRAMME

Sunday, July 9th

8.00pm John Holah, Technical Director, Holchem, UK - Principles of Hygienic Design
8.20pm Edyta Margas, Food Safety & Hygienic Design Expert, Bühler, CH - Hygienic Design of Food Processing Equipment
8.40pm Deb Smith, Global Hygiene Specialist, Vikan, UK - Hygienic Design of Food Industry Brushware
9.00pm Deb Smith, Global Hygiene Specialist, Vikan, UK - Workshop: Hygienic Design of Brushware

Monday, July 10th

12.15pm Amit Kheradia, Education & Technical Support Manager, Remco, USA - HACCP vs. HARPC
12.30pm Deb Smith, Global Hygiene Specialist, Vikan, UK - Minimizing the Spread of Contamination
5.15pm Stine Lønnerup Bislev, Hygiene Compliance Manager, Vikan, DK - Listeria and Food Safety
5.30pm Duane Grassmann, Market Hygienist, Nestlé USA & Canada - Validation of Cleaning Processes

Tuesday, July 11th

12.15pm Bill Bremmer, Principal/Owner, Kestrel Management, USA - Contamination and Cross-contamination in Food Operations
12.30pm Amit Kheradia, Education & Technical Support Manager, Remco, USA - Food Safety Culture & Color- Coding
5.15pm Deb Smith, Global Hygiene Specialist, Vikan, UK - Metal Detectable Brush Bristles
5.30pm Tom Kirby, Director of National Accounts Accuform, USA - Trends in Safety, 5S Organization