Advanced Course on Hygienic Design
Amsterdam, 10 – 13 December 2012

Program content

1. Introduction

2. Design Constraints and Requirements
   - History, Standardization & Legal Aspects
   - Machinery Directive; NEN-EN 1672; ISO 14159; NSF 3-A, EHEDG;
   - General Food Law

3. Know Your Enemy™
   - Damage and losses caused
   - Functional microbiology
   - Contamination/invasion mechanisms
   - Colonisation, biofilms, preservation and death

4. Scientific background EHEDG documents
   - EHEDG Test Methods, three tests, results on sheet

5. Hygienic Design of Food Production Systems
   - Uses Know Your Enemy™ to explain reasons behind design rules
   - Introduction document 8 & 10
   - Cleanability
   - Bad examples and effective solutions™
   - Wider coverage than just equipment

6. Material of Construction
   - Stainless steel; carrion; surface finish
   - Polymer use; FDA, Limitations, Management, Desorption
   - Background information integrity polymer surface (for seals)

7. Welding Stainless Steel
   - also set-up project; QA – QC incoming materials
   - permanent joint

8. Static Seals and Couplings
   - Design principle static seals; examples

9. Case Study: Spray Ball
   - Application; define: product contact areas; redesign model

10. Background: Rheology / Thermodynamics
    - Newtonian / non-Newtonian fluids; yield value (needed to understand case pump)
    - Flow rate; removal of micro-organism; falling film; results for closed equipment applicable to open equipment
    - Fouling heat treatment; sterilisation time (needed for heat treatment and reaction time)

11. Valves
    - Valve types
    - Hygienic versus aseptic
    - Double-seat valve
    - Case study weir-type valve
12. Dynamics Seals (Pumps)
   - Case Positive replacement pump with application; safety valve and yield value

13. Cleaning and Disinfection
   Course has up to now been focussed on removing invisible micro-organisms, but firstly visual soil has to be removed
   - Cleaning & Disinfection: background, application
   - Fouling, cleaning agents, cleaning methods (Sinner circle), CIP, ATP

14. Continuous Thermal Treatment Processes

15. Open Equipment Design

16. Packaging

17. Supporting Activities - Lubrication Use
   - FDA, Limitations, Management (following bearings; dynamic seals)

18. Building & Process Lay Out
   - design around process, equipment, logistics, etc.

19. Supporting Activities - Installation & Maintenance Procedures

20. Integration of Hygienic Systems
   - Risk management paramount – evidenced-based!
   - Starts with constraints: law, hygiene hazards, stakeholder requirements
   - All steps correct and present
   - Right sequence
   - Concurrency
   - Prescriptive design versus risk assessment
     o Buying and selling hygienic Equipment

21. Case Study (Pilot Plant)
   Groups of 3-4 persons at the largest public accessible pilot plant at Nizo Institute in Ede, Netherlands, with various pilot or semi production scale equipment;

22. Plenary Discussion
   - presentation each group of results case study

23. Student Course Evaluation

Optional afternoon with choice out of two subjects:
   - Dry material handling (Mr. Burggraaf) or
   - Aseptic Processing (Mr. Cocker)