## Basic Course Lectures Second Day (Thursday May 24th)

### Welding

*Alan Friis, Tech4Bizz, Denmark*

In this presentation a definition of an "ideal" hygienic weld will be given. Bad examples will also be discussed. Furthermore, there will be practical tips how to achieve better welds, because weld defects e.g. cracks, porosities or oxidation will cause increased adhesion of product residues and bacterial growth i.e. biofilms on surfaces. This is affecting the cleaning results negatively. The ideal "hygienic" weld is as easy to clean as the adjacent pipework. Furthermore, these defects can be starting points for corrosion. Properly welded joints are preferred to couplings with gaskets in cases, where welds can be used.

### Cleaning and Disinfection

*Gun Wirtanen, University of Helsinki, Finland*

The most important means for maintaining efficient microbial control include minimizing the microbial load from outside sources of the process, efficient control of growth at microbiologically vulnerable sites, and adequate cleaning and disinfection of the process lines. The general aims of cleaning and disinfection is to remove food residues and biofilms, i.e. microbes embedded in self-produced extracellular polymeric substance, from process surfaces and thus be able to produce safe products with acceptable shelf life and quality. Packaging machines, conveyor belts, dispensing equipment, brining equipment, slicing and cutting machines as well as pasteurizers and cooling equipment are known to be difficult to clean. The mechanical and chemical power, temperature and contact time in the cleaning regime should be carefully chosen to achieve adequate cleaning results. Correct operation of the entire system under controlled conditions is important, and the microbial control programmes including cleaning and disinfection should be integrated in to the overall processing. Cleanliness of process surfaces should be detected regularly with suitable methods.

### Lubricants in Food Processing

*Gun Wirtanen, University of Helsinki, Finland*

This presentation will deal with the registration of food grade lubricants, storage and handling of food grade lubricants, the importance of Good Manufacturing Practice as well as hazards in the food production caused through lubricants and how to switch food grade lubricants. Lubricants in food-processing equipment decrease friction and wear, inhibit the access of outside particles to equipment surfaces, protect surfaces against corrosion, increase the efficiency of systems and the transfer of heat, power and electricity. The food-grade lubricants must fulfil legislative requirements and be safe with neutral taste and odour. Lubricants are composed of base oils (e.g. mineral oil, white oil, silicone), thickeners and additives. The lubricants can be solely oil-based but they often contain water. List of allowed ingredients is kept by the U.S. Food and Drug Administration (FDA). NSF International offers ISO 21469 certification of lubricants used in food, pharmaceuticals, cosmetics and animal feed manufacturing. The proven lubricants are labelled with the official NSF ISO 21469 certification mark. A list of lubricants can be found at www.nsfwhitebook.org. The lubricant marks are: H1 i.e. the product can come into incidental contact with food, H2 means that the lubricant should absolutely not come in contact with food, 3H stands for proprietary substances i.e. release agents and HT1 for heat transfer fluids in incidental contact. It is to be noted that Listeria monocytogenes has been isolated from a variety of food-processing equipment and thus also from lubricants in use. L. monocytogenes can survive in lubricants especially, when the lubricants are contaminated with organic material and water, because L. monocytogenes tolerates anaerobic conditions and low water activity.