



APPLICATION NOTE

Cleanroom Technology in the Food Processing Industry

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Cleanroom technology involves the control of air purity, airflows, air pressurisation and air temperature and humidity. It involves not just the air system, but the physical design of the room or space and the procedures required of the occupants of the room or space.

In New Zealand, cleanrooms are most commonly found in Pharmaceutical applications – both in manufacturing plants and in hospital dispensing applications. Overseas, the cleanroom industry is driven primarily by the increasingly stringent requirements of the silicon chip industry.

Cleanroom technology is not always required. In some processes, contamination problems can be avoided by better cleaning of process equipment and the workplace, and stricter operator procedures. But increasingly food manufacturers overseas and in New Zealand are turning to cleanroom technology to control airborne contamination and increase product shelf-life.

Food industry cleanrooms are clearly less “clean” than those found in semiconductor fabrication plants or sterile pharmaceutical applications. And the requirements vary depending on the food being produced. For example the requirements in a bakery (a dry process) are going to be less stringent than in the (wet) dairy industry. And even within the dairy industry, the requirements for fluid milk will generally be less than for yoghurt or cultured milk, where bacterial activity is more intense.

Food processors will usually consider cleanroom technology because they are concerned with the spread of bacteria, yeasts and moulds that can grow in the moist conditions of process areas and are carried by air currents throughout the food plant. The aim will be to keep the air in the immediate vicinity of the food being processed free from such microbial contaminants. This can reduce or eliminate the need for pasteurisation or flash freezing process stages and lead to a better, fresher food product.

The first stage of an evaluation of cleanroom technology should be to specify exactly the contamination problem to be solved i.e. What is the contamination and at what stage in the process is it affecting the food? It may be worthwhile to have air around the process sampled and analysed to check that contamination observed on the food is present in the air supply. The type of contaminant will impact the design of the filtration. For example, medium efficiency (F8) filtration, if installed correctly, will remove 99.99% of a fungus (approximately 6 microns) but HEPA filtration would be required to have the same efficiency against 0.3 micron bacteria.

Once the contamination problem is defined, a cleanroom specialist should be involved. Cleanroom technology is much more involved than commercial or industrial ventilation and air-conditioning. A good cleanroom specialist will help you develop a cleanroom specification that will avoid the danger of investing in a system that either doesn't work or that provides more protection than actually required at an unnecessarily high cost. Air Care Technology can recommend cleanroom specialists.