# Are bacteria-free IQF freezers possible?

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Prevention is always better than cure so this article focuses on IQF freezer design principles for a bacteria-free environment. Bacteria-free is becoming a hot issue especially as the Ready To Eat (RTE) frozen processed foods sector is growing so rapidly.

Large food producers are demanding bacteria free IQF freezers, and legislation is also toughening up in recognition of the health threat posed. Good freezer design always makes hygiene a priority, so let us look at the problem and then how we can lock bacteria out from IQF environments.

## The problem

Even when implementing best practice in food processing plants there is still a real threat. Most modern IQF freezers cannot be properly cleaned due to their design. The wet, dark environment with poor access makes them difficult or even impossible to clean. Added to which the fans that circulate the air create the perfect environmental conditions to contaminate uncontaminated produced food.

The bacteria risk of a hard-to-clean freezer can have deadly consequences. As food borne pathogens go listeria needs special attention since it has a mortality rate of up to 30-40% in recorded outbreaks of infected food. It can survive and thrive in a broad range of climatic conditions.

Whilst cold inhibits its growth it will, and does, survive in typical freezer temperatures of minus 30-40°C. It loves wet, damp and dark conditions making a freezer interior the perfect hiding place and breeding ground.

***A combined cleaning/disinfection unit, incorporated into an IQF freezer that injects the detergents in the air-stream of the fan. This supports freezers that are designed to be cleaned.***

## Tougher legislation on the way

Tough legislation is already in place in Europe to combat the threat from food borne pathogens. Tougher FDA legislation, specifically targeting listeria, is in the pipeline for all frozen food including RTE food products imported into the USA. The cost implications of tougher FDA legislation will hit hard food producers who rely on exports to the USA from countries such as Mexico, Central and South America. For example, exporters will have to pay for the cost of inspections by the FDA.

## Potential breeding ground

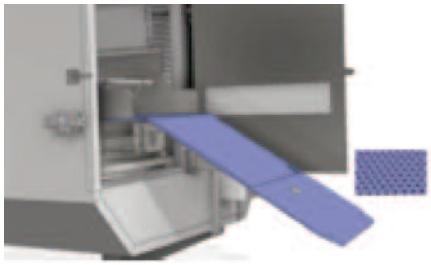
Food processed through most freezers today is not guaranteed to be bacteria free. The food requires heat treatment to be suitable for human consumption. This food is described as Ready to Heat (RTH).

However there is a growing consumer demand for RTE foods, so the challenge is to use a guaranteed bacteria free freezer. Since most IQF freezers design makes them impossible to clean they are a potential breeding ground for bacteria, and therefore not suitable for RTE processing.

## Bacteria free design

Key freezer design principles should prevent contamination and achieve a bacteria free IQF freezer. However, no matter how good the design, maintaining a bacteria free environment can only be achieved if the freezer is properly cleaned and validated.

The objective with good freezer design is to ensure that the machine prevents rather than causes the growth and spread of bacteria. The ideal is to have a hermetic Mono-block shell rather than an individual panel or welded panel construction. Fitting panels together always leaves a small gap that has the potential to allow water in, in the form of condensation or vapour.



***Removable bedplates for thorough cleaning and disinfection, and for easy access to the belt guides.***

Often panel-constructed IQF freezers, use silicon seals to close the gaps. This is perfectly adequate on day one but after a few weeks, of high pressure cleaning and disinfecting, the seals corrode and break up allowing condensation to occur, providing ideal growth conditions for bacteria.

Hermetic Mono-block constructed IQF freezers, such as the OctoFrost by IQF Frost, avoid these problems since the shells are constructed in one airtight piece, so there are no grooves or joints where the bacteria can hide. If constructed using non-hygroscopic polystyrene inner surface coating protected by a glass fibre outer surface coating then it is impossible for water to penetrate.

The floor is another collector of water and condensation. This is especially true for those freezers resting directly on a concrete floor without ventilation underneath them.

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***Even after cleaning over several hours, belts can still be clogged with food residue.***

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A floor full of water with accumulated cold takes many hours to thaw thus preventing efficient cleaning within the time allowed

For cleaning and disinfecting purposes it is important the freezer is of an open design. This means all parts, internally and externally, can be easily accessed for cleaning and disinfecting. It also means designing out any nooks and crannies where bacteria can grow and multiply. Another area of prime concern is the method of transferring the produce through the freezer. Traditional IQF freezers use a metal or plastic conveyor belt system.

Although the belts can be cleaned outside the freezer they are almost impossible to clean effectively. Even after cleaning over several hours, they can still be clogged with food residue.

Even if the belt is eventually properly cleaned a real problem remains with the belt supports, which are made up of glide strips, springs and wheels. By their very nature they are notoriously difficult to access and clean.

Removable bedplates are preferred to the belt construction, since they can be easily cleaned, and make it much easier to access and clean the belt guides thoroughly.

## Top ten tips in IQF freezer selection

- Hermetic/air tight Mono-block shell – to provide an environment where bacteria cannot hide.
- Non-hygroscopic insulation – to prevent condensation and water from entering and being absorbed.
- Open design – to allow all parts of the freezer to be easily accessible.
- Removable bedplates – to allow proper cleaning of the surfaces, and complete removal of particles. Also to give cleaning access to the guides.
- Sloping surfaces – always towards the drainage to ensure no accumulation of water.
- Avoid concrete floors – the freezer should be raised up to allow ventilation.
- Use a Coil Cleaning System – with high pressure water to defrost the coil and remove all particles.
- Use strong evaporation coil fins – to withstand high pressure water cleaning.
- Use foam system – this uses the fans to circulate foam to reach all parts of the freezer. The same system can be used for complete disinfection of the freezer.
- Avoid trench drainage channels – these accumulate moisture and water which is hard to remove.

*If you follow these recommendations and design tips there is more than a good chance that you will be able to specify, purchase or recommend a bacteria free IQF freezer.*

## Water, water everywhere!

Tube and trench drainage systems (for run-away) often pose a bacteria risk. Spraying cleaning-water within the freezer, with these types of drainage channels makes removal of water almost impossible. Added to which the drainage channels are often difficult to access and so provide the perfect breeding ground for bacteria.

## Blowing in the wind

Another serious issue is that freezers that harbour bacteria are at further serious risk of blowing the bacteria around the freezer via the fans. This in effect spreads any potential hazard throughout the freezer, making it impossible to remove the bacteria from the contaminated freezer once established. ■