The Safe Way to Blast Chill, Freeze and Thaw
Why Blast Chill?

Blast Chilling & Freezing: The only way to ensure food safety and quality

Current food legislation requires that all food must be cooked as quickly as possible. This means that whenever food is chilled or frozen, it must be in the “Danger Zone” between +4°C and +18°C, where bacteria multiply fastest, for as little time as possible. Under ideal conditions, bacteria split into two every 20 minutes. So from 1 bacterium to 69 million in 12 hours!

According to the Food Standards Agency, an estimated 5.5 million people a year are affected by food poisoning, the vast majority as a result of eating in a restaurant, café, takeaway or fast food outlet.

To minimise the time spent in the Danger Zone, a specially designed Blast Chiller or Freezer is required - standard refrigeration equipment just isn’t capable of extracting heat fast enough. Why put warm food in a refrigerator just won’t suffice:

Food quality is reduced by damage to texture & consistency. Bacteria have time to multiply before a safe temperature is achieved; the refrigeration temperature is raised; bringing other food into the “Danger Zone”!

What is Blast Chilling?

Department of Health Guidelines state that to safely Blast Chill food its temperature must be reduced from +70°C to +2°C or below within 90 minutes. Many Blast Chillers, including the Foster range now exceed this requirement and can safely blast chill from a starting temperature of +90°C.

What is Blast Freezing?

Current European guidelines recommend that food be reduced from a temperature of +90°C to –18°C in no more than 240 minutes. Many Blast Chillers, including the Foster range now exceed this requirement, and can safely blast chill from the equivalent of a +90°C blast.

The Facts

For too long the catering industry has not chilled food properly, simply leaving it out to cool in the kitchen, or placing it in a general purpose refrigerator which is too slow. These are highly dangerous practices, especially in summer, and could very easily lead to food poisoning.

Food poisoning is on the increase and can be fatal.

According to the Food Standards Agency, an estimated 5.5 million people a year are affected by food poisoning, the vast majority as a result of eating in a restaurant, café, takeaway or fast food outlet.

The Law & how it affects you

The Food Safety Act 1990 makes it an offence to “render food injurious to health” or to sell food that does not comply with safety requirements.

The Guidelines for Cook–Chill and Cook–Freeze Catering Systems, 1989 state that “food should be chilled to between –2°C and –4°C, within a period of 90 minutes. A specially designed rapid chilling apparatus is required if rapid reduction of temperature is to be achieved.”

To ensure that you meet the above obligations, food must be blast chilled. The prosecution only has to prove “beyond reasonable doubt” that a person has not met food safety requirements. The 1990 Act includes severe penalties – a fine up to or up to two years’ imprisonment. Ignorance is unacceptable and is not a satisfactory defence, nor is it good business sense either!

Due Diligence is the only defence: “It shall be a defence for the person charged to prove that he/she took all reasonable precautions and exercised all due diligence to avoid the commission of the offence.”

The Future

Traditionally blast chilling was only a necessity for large institutional kitchens using Cook-Chill operations. Now, it is essential in hotels and restaurants where their banqueting systems use cook-chill and chill kitchens and catering facilities are insisting on having Blast Chill facilities to maintain the quality of their cooked product, maximise food hygiene and reduce wastage.

The European Commission is planning to implement a new European Directive on Food Safety in the next few years, which will include legislation on safe food chilling. The Directive will require that ALL catering facilities use Blast Chilling equipment to cool down cooked food.

How do Blast Chillers & Freezers work?

They operate in a similar fashion to comb or convection ovens with powerful fans creating a fast even air flow, except the air, of course, is cold instead of hot. Using a high-powered refrigeration system, cold air is blasted laterally over the product at high speed, extracting heat at an optimum rate, whilst maintaining food quality. Once the foods out of the Danger Zone and the chill or freeze cycle is complete, the equipment switches into “Hold mode” to keep the food at the required temperature (+3°C chilled. –18°C if frozen).

But I don’t need a Blast Chiller...

If you serve hot meals, then you will almost certainly benefit from using a Blast Chiller or Freezer. The Foster range offers a capacity to suit all volumes, from the small independent restaurant to a large-scale Cook-Chill operation. Blast Chillers not only ensure food of the highest quality, but also make it easy for caterers to comply with Food Safety and Temperature Control legislation, keeping your customers and the Environmental Health Practitioner happy.

Benefits of Blast Chillers & Freezers

Quality

• Damaging bacteria is rendered dormant, minimising food spoilage
• Colour, texture, flavour, structure and nutritional value is locked in

Dishel reflects surfaces such as pasta and fruit are protected, as rapid chilling stops an “ice skin” forming which otherwise dehydrates and damages the products’ appearance.

Blast freezing also helps to keep food looking good. The slower food freezes, the larger the ice crystal formed, and large ice crystals can damage food, dry it out, and break down the physical structure leaving you with an unacceptable product.

Air chill/freeze temperatures are fully adjustable, depending on the food to be chilled, to ensure your end product is of the best quality.

Reduced Food Wastage

Kitchens with blast chillers and freezers throw away less food. Food left over can be blast chilled and safely held in Blast Chiller for later use, with complete confidence in its quality and safety.

Once prepared and chilled, only the correct numbers need be reheated, so legislation states that chilled food can be safely kept below +3°C for up to 5 days after production.

Blast chillers can even be used to chill wine, cans or other drinks, buffet dishes, salads and serving dishes.

Kitchen Efficiency

Blast Chilling allows you to manage your kitchen better. Advance food preparation lets you prepare larger batches when it suits you and chill or freeze them for later use. This makes for fewer (larger) batches, more efficient use of ovens, more predictable working hours and optimum use of your chef’s schedule, and gives you time to improve on presentation and attend to customers.

Blast chilling can increase your potential profits by increasing productivity and reducing food wastage. It can even help you to increase your menu options.

Gastronomic Flexibility - The Foster range is compatible with all your kitchen equipment as it takes all standard Gastronorm 1/1 containers and trolley-loading models are compatible with all standard catering trolleys.

Food surface protection

The appearance and surface texture of food is safe with Foster, Blast Chilling. For instance, such as rice, pasta, fish or fruit, is blast cooled without affecting product appearance through surface dehydration.

This food surface protection is achieved using Foster’s Circulair® air circulation system. The airflow is “sucked through” rather than blown onto food, and flows in a horizontal direction. This means that cold air flows over - rather than directly at - the food surface. In addition the speed of the airflow is automatically controlled and adjusted during both the blast chill and the hold phases. This prevents an “ice skin” forming on the product and also stops “wind chill” damage and dehydration to the food surface - thereby maintaining the visual appeal and the taste of the product.

For blast chill topping, Blast Chillers allow you to cool down your food quickly and safely. This cycle brings the temperature of the food down whilst retaining a positive air temperature. This prevents large ice crystals forming which can damage the structure of delicate foods such as gateaux and pastries and ensures perfect ice crystal formation, and high water content items such as vegetables, rice and pasta. Using this programme thereby maintains the texture, consistency and appearance of these foods, with no dehydration or cell damage.

Why is Foster a good choice?

• Durable door designed with magnetic gasket
• Coated coil - stops corrosion and prolongs refrigeration system
• Info Update Screen shows all you need to know
• Automatic Hold function
• Simple menu-driven dial enables even a new operator to work the equipment
• 4 main programmes

The new Foster range of Blast Chillers also have the following benefits:

• Now capable of blast chilling from +90°C to 0°C
• Automatic Defrost & “Smart Defrost” functions ensure maximum performance and minimum energy usage.
• Foster Info Update Screen shows all you need to know
• MAC/CF data output option
• Foster Circulair® air circulation system ensures uniform chilling whilst protecting the food surface
• Coated coil - stops corrosion and prolongs refrigeration system life
• Durable door designed with magnetic gasket

Soft Chill, Hard Chill, Hard Chill Max and Shock Freeze: What do they mean?

These are the 4 main programmes that you will need to use your Blast Chiller or Freezer for:

Soft Chill - For the safe chilling of delicate products. The Soft Chill cycle is ideal for the rapid but gentle chilling of any dish. This cycle brings the temperature of the food down whilst retaining a positive air temperature. This prevents large ice crystals forming which can damage the structure of delicate foods such as gateaux and pastries and ensures perfect ice crystal formation, and high water content items such as vegetables, rice and pasta. Using this programme thereby maintains the texture, consistency and appearance of these foods, with no dehydration or cell damage.

Hard Chill - For general purpose chilling. The Hard Chill cycle is ideal for chilling “standard products” such as cooked meat, pies, lasagne, individually portioned meals etc. The new Foster range keeps the air temperature at around -1°C for the first 70% of the cycle, to reduce temperature quilling. Air temperature is then increased for the last 30% of the cycle to stop surface damage and to ensure quality.
In this situation, guidelines recommend that joints are either portioned before chilling, or chilled as quickly as is possible.

- **Product that is hotter than the recommended starting temperature will obviously take longer to chill**
- **It is recommended that foods are not covered or lidded, as this will extend the time required. Use of deep containers will also extend the chilling time**
- **It is essential that good airflow passes over the product to facilitate even and consistent chilling. Foil should not be used to cover food if possible**
- **Always check the food product before and after with a hand held temperature probe and record it**
- **Do not overfill containers (recommended depth is 25mm) and keep food evenly spread**
- **Allow food to rest after cooking-especially meat to ensure the quality and texture of the end product. Guidelines recommend that food is rested and cooled for 30 minutes before blast chilling**
- **Do not overload the Blast Chiller as this will mean the required temperature will not be achieved in time**
- **Always clean and sanitise the fitted core probe before use**
- **Decent hot liquids into manageable size Gastronorm containers**
- **Pre-Chilling the unit is recommended to improve the cooling time**
- **If in doubt, use the probe to ensure safe temperatures are achieved**

**Guide Blast Chilling & Freezing Times**

<table>
<thead>
<tr>
<th>Food Type</th>
<th>Blast Chill Programmes required</th>
<th>Time required to Blast Chill (minutes)</th>
<th>Time required to Shock Freeze (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>Hard</td>
<td>40-90</td>
<td>60-240</td>
</tr>
<tr>
<td>Fish</td>
<td>Soft</td>
<td>30-90</td>
<td>90-240</td>
</tr>
<tr>
<td>Prepared Dishes</td>
<td>Soft, savoury, lasagne, rice, shepherd's pie</td>
<td>30-90</td>
<td>90-240</td>
</tr>
<tr>
<td>Vegetables &amp; Pulses</td>
<td>Steam or roasted veg, rice and potatoes etc</td>
<td>30-90</td>
<td>90-240</td>
</tr>
<tr>
<td>Fruit</td>
<td>Soft</td>
<td>60-90</td>
<td>90-240</td>
</tr>
<tr>
<td>Bakery Cakes</td>
<td>Hard</td>
<td>20-90</td>
<td>70-240</td>
</tr>
<tr>
<td>Bakery Pastries</td>
<td>Hard</td>
<td>60-90</td>
<td>90-240</td>
</tr>
<tr>
<td>Desserts</td>
<td>Fruit-based desserts &amp; egg based dishes</td>
<td>30-70</td>
<td>70-240</td>
</tr>
</tbody>
</table>

**Thawing**

Having made sure your food is blast frozen properly and quickly, it is vital that the defrosting is equally controlled in a cabinet that is designed for the job. Dangers occur when food products are allowed to thaw in ambient surroundings. For example, if a product is left out overnight or for several hours in a warm kitchen to defrost, the surface of the product is likely to rise to +20ºC or more, which accelerates the growth of bacteria.

To defrost food, the air around needs to be relatively warmer than the food itself so that heat can be transferred from air to food to melt the ice. If it is too warm it will cause high surface temperatures before the core of the product is defrosted. If it is too cool, there will not be a sufficient temperature difference to transfer heat quickly enough to the food and it may take a long time to defrost the product. A quick steady thaw with continuously introduced heat is the reason why a thawing cabinet gives such excellent results.

Foster Controlled Thaw cabinets operate at approximately +10ºC and circulate air at accelerated speed over frozen food. This is done by means of alternate gentle heat (provided by heaters) and refrigeration via special air ducting and fans. This speeds up the thawing process so that large quantities of similar food can be thawed at the same time keeping food temperatures within safe limits while defrosting.

The Basic Do’s & Don’ts of Blast Chilling & Freezing

Different foods give up their heat at different rates and therefore there are certain factors that need to be considered when determining chill or freeze time, and which programme should be used. A 10kg meat joint will not have the same chilling requirements as 10kg of patisserie product.

- **Density, water content, and fat content all affect the time required to achieve temperature**
- **Delicacy of the foods’ structure and surface must be taken into account when selecting the programme required**
- **Weight loadings and the thickness of product should not be exceeded. Foster recommends a maximum loading of 3.75kg per Gastronorm 1/1 container**
- **Large joints of meat will not chill within the standard guidelines**

**Government Publications:**
Food Safety Act 1990
Food Hygiene Regulations 2006
The above titles are available from: The Stationery Office, Tel: 0870 600 5522, www.tsoshop.co.uk
Available from: The Department of Health, Tel: 0207 210 4850

**Other Foster Blue papers include:**

Energy Efficiency
The ECA Scheme
Hydrocarbons in Refrigeration - What caterers need to know
The Climate Change Levy
Fire Ratings & Coldroom Panels
Food Temperature Laws
Inspection by Environmental Health Practitioners
Food Safety and E. Coli
HACCP: Hazard Analysis Critical Control Points
Handling and Serving Ice
CFC’s: Refrigeration and the Caterer
Safe Food Storage
Plan for a Catering Crisis

**For copies of our other Blue Papers, visit www.fosterrefrigerator.co.uk/food_safety or call 0843 216 8800**

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