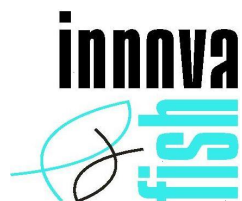


Proton[®] Fusion Defreezer

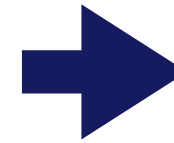
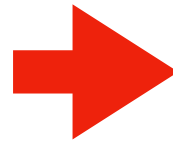


PERFECT DEFROSTING



www.proton-europe.com
NARA (JAPAN) - BARCELONA (SPAIN)
T: +34 627 925 103
proton@innovafish.com

PROTON & FUSION CYCLE: FREEZING & DEFROSTING



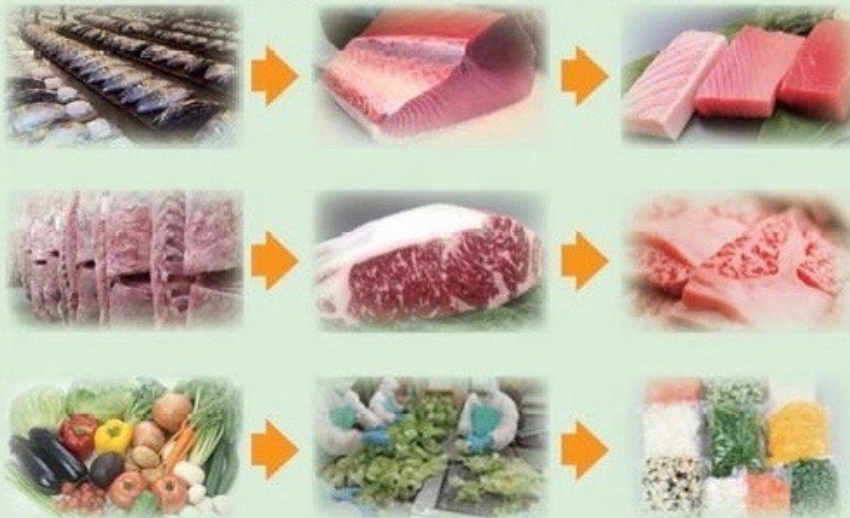
FRESH RAW
MATERIALS

FREEZING
MAGNETIC
PROTON

DEFROSTING
FUSION

原料産地

原材料一次加工および二次加工



調理工場

凍結状態

最終商品まで調理加工



国内・海外消費地

解凍後盛り付け

国内・海外消費地で販売



最先端技術プロトン凍結機・解凍機活用
※全ての過程でプロトン凍結機・解凍機を活用します。



プロトン凍結機



プロトン解凍機

DEFROSTING

When a food is thawed, the surface ice layer melts into a layer of liquid water whose thermal properties are lower than those of solid-state water. As a consequence, the speed with which heat is transferred into the food increases this insulating effect as the defrosted food layer increases.

That is why the defrosting of a food, for the same temperature gradient, is slower than its freezing.

Cell damage caused by slow freezing and recrystallization causes the loss of cellular components, which manifests itself as an exudate in which various compounds of nutritional value are lost.

Defrosting should be conceived minimizing the following parameters:

- microbial growth,
- loss of fluid,
- dehydration losses and
- losses due to deterioration reactions.



As indicated in advance, prolonged maintenance of the product at temperatures slightly below 0°C is unfavorable because the product is exposed to relatively high concentrations of solutes and the development of psychrophilic microorganisms is favored.

Defrosting is usually carried out at a temperature slightly higher than the defrosting point.

DEFROSTING

LATENT HEAT is the energy required by an amount of substance to change phase, from solid to liquid (heat of fusion) or from liquid to gas (heat of vaporization). It should be taken into account that this energy in the form of heat is invested for the phase change and not for an increase in temperature.

Formerly the term latent heat was used to refer to heat of fusion or vaporization. Latent, in Latin, means hidden, and it was called that because, when a temperature change was not noticed while the phase change occurs (despite adding heat), it remained hidden. The idea comes from the time when it was believed that heat was a fluid substance called caloric. On the contrary, the heat that is applied when the substance does not change phase and the temperature increases, is called sensible heat.

When heat is applied to a piece of ice, its temperature rises until it reaches 0°C (temperature of state change); From that moment, even if heat is still applied, the temperature will not change until it has completely melted. This is because heat is used in the melting of ice. Once the ice has melted, the temperature will rise again until it reaches 100°C ; from that moment, the temperature will remain stable until all the water evaporates.



SENSITIVE HEAT is the heat energy supplied to a body or an object, which increases its temperature without affecting its molecular structure. In general, it has been experimentally observed that the amount of heat needed to heat or cool a body is directly proportional to the body's mass and temperature difference. The proportionality constant is called specific heat. To increase the temperature of a body it is necessary to apply a certain amount of heat (energy). The amount of heat applied in relation to the temperature difference achieved depends on the specific heat of the body, which is different for each substance.

The name comes from the opposition to latent heat that refers to the "hidden" heat, that is to say that a temperature increase is supplied but not "perceived" as in the phase change from ice to liquid water and from this one to steam. **Sensitive heat is perceived, since it increases the temperature of the substance, causing it to be perceived as "hotter", or conversely, if heat is subtracted, it is perceived as "colder".** cibe como "más fría".

THE NEW GENERATION OF DEFROSTERS: FUSION DEFROSTER

Defrost fast , without losing flavor!!

High quality Defreezer

Movable proton Defreezer that allows frozen foods to defrost in best form ever!

Proton Defreeze
Fushigi-na

New!

kinoko

Movable type

Latest Defreezing Technology Proton Defreeze

Keep the flavor

[Restore the flavor to before freezing]

Keep the color

[Restore the color of the food to before freezing]

Keep the savor

[Defrost without losing savor]



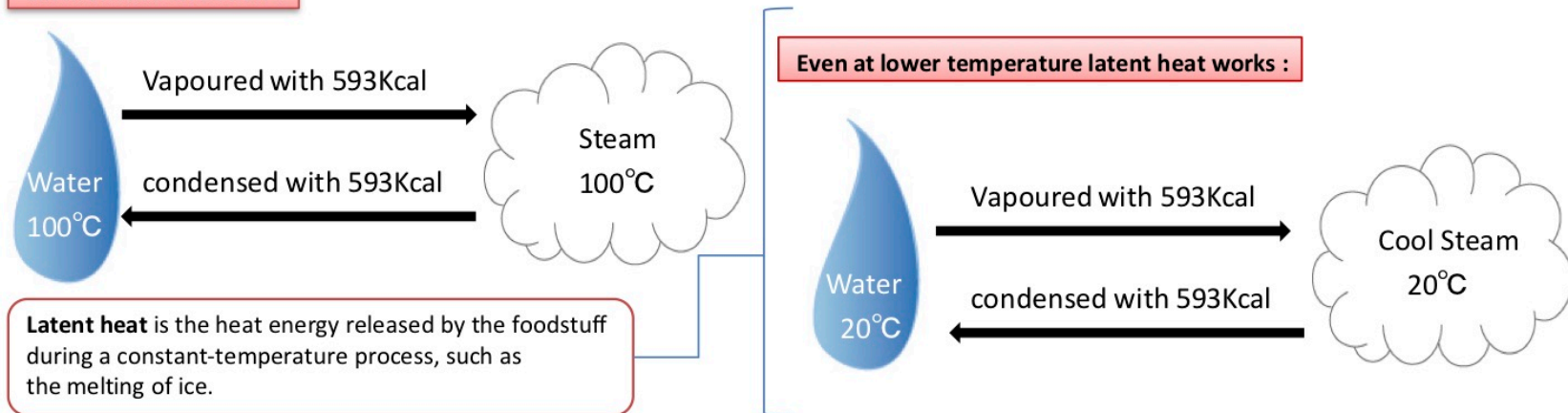
DEFROSTER FUSION TECHNOLOGY

Principle of Proton Fusion Defreezing Technology

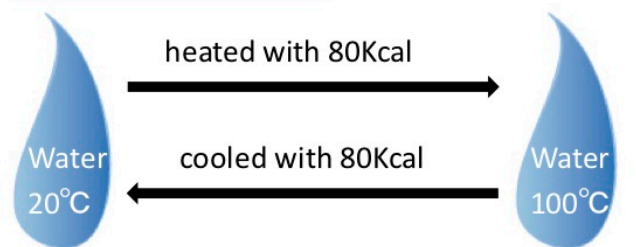
Proton Fusion Defreezer melts the frozen foodstuff utilizing the condensed latent heat of 539 Kcal/kg generated when steam is sprayed onto its -20°C to 0°C surface to transform to waterdrops.

By utilizing the very big energy of the latent heat, we perform the most efficient defreezing with better yield and of the highest quality.

Latent heat illustration :

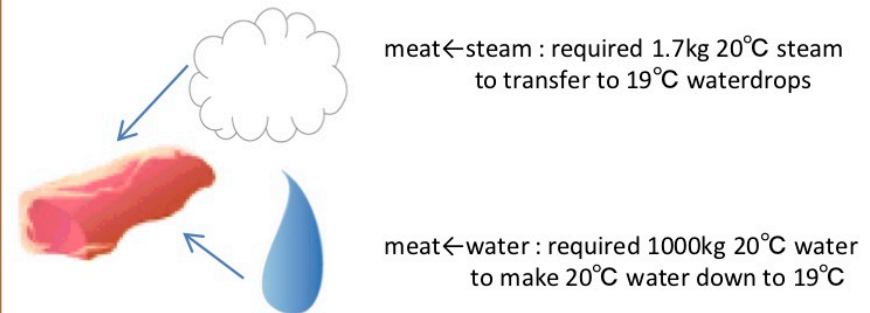


Sensible heat illustration :



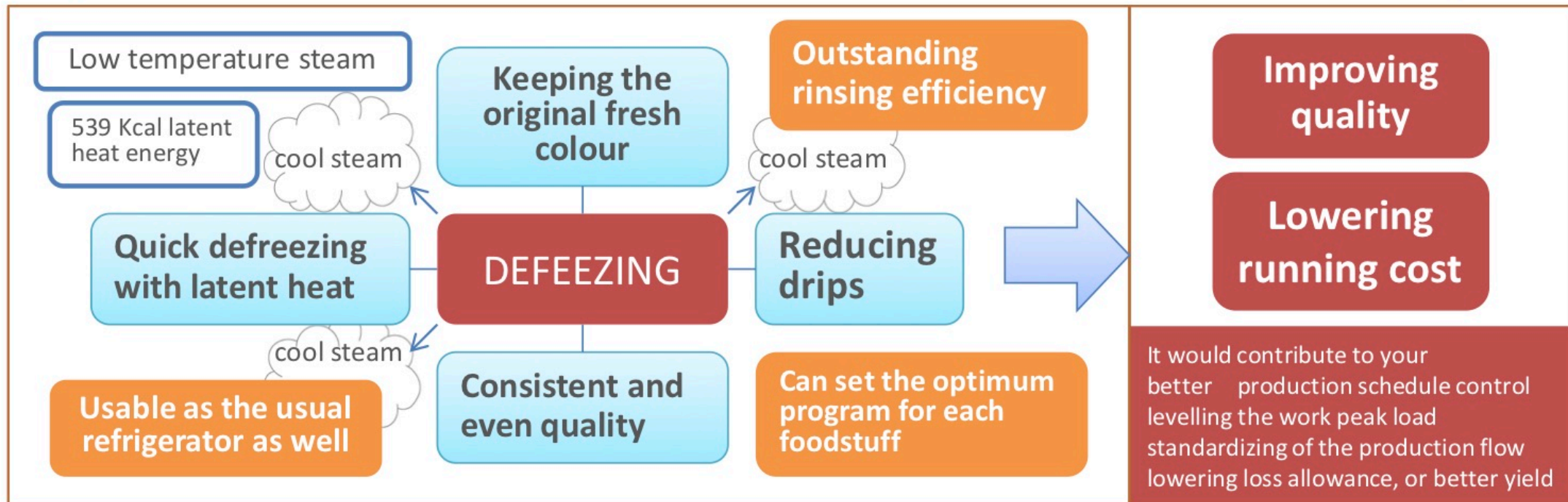
Sensible heat is the heat energy consumed for a change of the temperature without changing the form of material.

Example : for giving 1000Kcal to the frozen meat



DEFROSTING OF LATENT HEAT OF VAPOR at low temperature

Illustration of the latent heat capability of the low temperature steam



With the "cold steam", to suppress the drip, the defroster recovers the original quality.

The latent heat of condensation occurs when water becomes steam.

The blown steam becomes a drop of water in contact with defrosting (frozen food) at about 0°C from -20°C .

At that time, given the amount of heat close to the defrosting products of 586 kcal / kg (20°C), it is produced without losing quality and reducing the cost of operation.

DEFROSTING OF LATENT HEAT OF VAPOR at low temperature

Outstanding feature of Proton Defreezer as the following:

(1) Much **quicker** defreezing with better quality than the conventional way with the refrigerator.

Function : Enable to defreeze without being dried under atmosphere of low temperature with **100% humidity**.

& exceptionally quicker defreezing due to energy as big as 593 Kcal/kg, by which the cooler steam is condensed into waterdrops.

Merits :

- **Shortening the working time** for defreezing.
- Quicker defreezing would result in less drips, hence much better defreezing yield.

(2) Defreezing **at lower cost** and with better yield than defreezing by water current.

Function : utilizing steam of lower temperature, which volume is by approx. 1,200 times bigger than water.

Merits:

- **Water consumption** for defreezing can be **reduced to as low as 1/3 to 1/5**.
- No drips by the osmotic pressure of water.
- No drips due to water current.

(3) Far more **even and safer** defreezing than that with water current.

Function: Very even defreezing with the variable wind blowing system.

Steam is safely sprayed from the sterilized source.

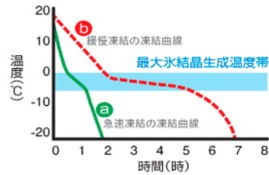
Preventing warming of the foodstuff with 3 stages program suitable to each of them.

Merits:

- The constant defreezing parameter throughout a year effectively avoiding the seasonal temperature fluctuation of the city water.
- Unnecessary to rinse the water tank periodically as we use non-contaminated safer steam.
- There is no risk that the temperature of the foodstuff goes up to that of water. Moreover, it is possible to store it frozen after completion of defreezing inside the defreezer.



DEFROSTER FUSION DEFENSE TESTS



(1) Defrosting much faster and with better quality than the conventional way with the refrigerator.

FUNCTION:

It allows defrosting without drying in a low temperature atmosphere with 100% humidity.

And an exceptionally faster defrosting due to such a large energy (593 Kcal / kg.) That it causes the colder steam to condense into drops of water.

ADVANTAGE:

Shorten the work time to defrost.

Faster defrosting causes less dripping, therefore, much better defrosting performance.

(2) Defrosting at a lower cost and with better performance than defrosting by running water.

FUNCTION:

It uses low temperature steam, whose volume is approx. 1,200 times larger than water.

ADVANTAGE:

Water consumption for defrosting can be reduced to a minimum of 1/3 to 1/5.

It does not drip from the osmotic pressure of water.

(3) Defrosting much more uniform and safe than with running water.

FUNCTION:

Very uniform defrosting due to variable wind system.

The steam is sprayed safely from the sterilized source.

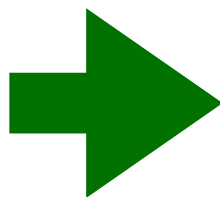
It prevents heating of the food product with a 3-stage program suitable for each of them.

ADVANTAGE:

The constant defrosting parameter for one year effectively prevents the fluctuation of the seasonal water temperature.

It is not necessary to rinse the water tank periodically as steam that is safer and uncontaminated is used.

There is no risk that the temperature of the food rises to that of the water. It is possible to store it defrosted after completing defrosting inside the defroster.



**THE FREEZING
INDUSTRIAL
MORE PERFECT**

COMPARATIVE OF THE DIFFERENT DEFROSTING METHODS

	Proton fusion system	natural defreezing	by city water	by electromagnetic radiation
applicable foodstuff	meat, fishes, vegetables, side dishes	almost all foodstuff	meat, fishes, vegetables	homogeneous foodstuff
sanitation aspect	no problem with sterilized steam	risk of contamination with various germs	risk of contamination with various germs	no problem
drips	very few	much	much	not completely defrozen
Evenness of defreezing	very evenly defrozen	surface be degraded	surface be degraded	surface may be boiled
Storing after defrozen	usable as refrigerator as well	should store at refrigerator	should store at refrigerator	should store at refrigerator
initial installation cost	reasonable	zero	cheap	very expensive
running cost	cheap with energy efficiency	zero	expensive with water consumption	expensive
running cost index	100%	0%	231%	266%

Note: With Proton Defreezer drips could be reduced from 6.496% down to 1.74%, resulting in improving profitability.

COMPARATIVE OF THE DIFFERENT DEFROSTING METHODS

EJ. CHICKEN MEAT

Example, data analysis of chicken meat defreezing:

Mode of defreezing	by Proton Defreezer	by water	by refrigerator
Defreezing time	90 minutes	70 minutes	50 hours
Heat source	latent + sensible heat	water sensible heat	air sensible heat
Heat source unit	583Kcal/kg (25°C)	1Kcal/kg	0.003KwH
Required quantity	0.22kg steam	115 liter	50 hours
Running cost	¥2.35	¥37.00	¥2.00
Performance	no drips uniform defreezing	many drips surface temp. increased	many drips took too long time

Chart-1: data of Proton fusion defreezing system

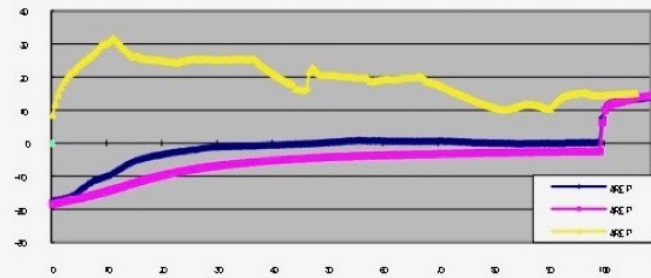


Chart-2: data of defreezing by the city water

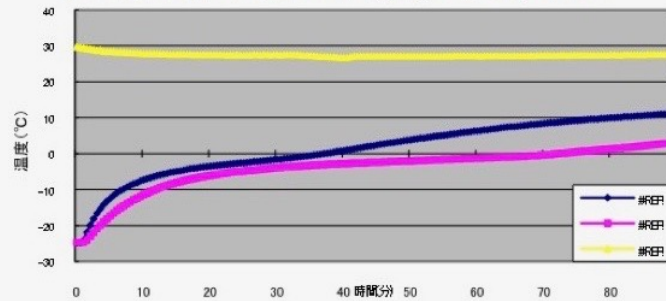
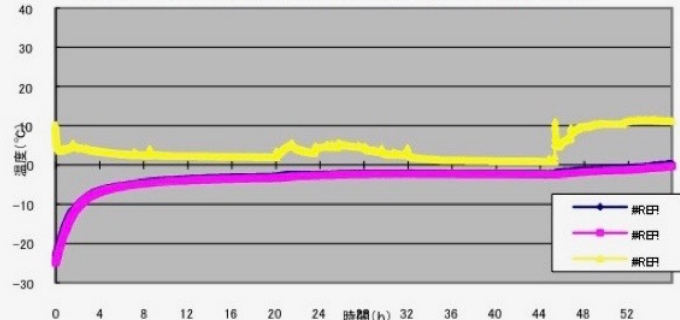
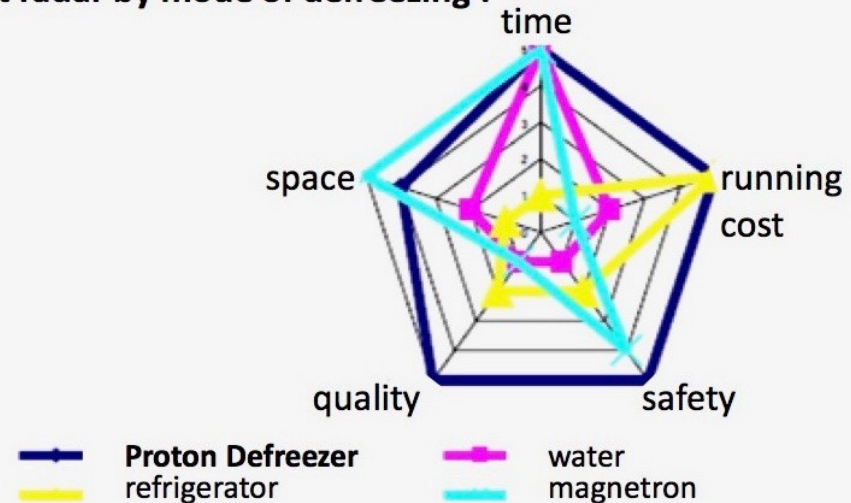


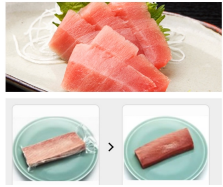
Chart-3: data of defreezing by refrigerator



Merit radar by mode of defreezing :



FROZEN PRODUCTS WITH FUSION



TUNA



FISH



SEAFOOD



MEAT



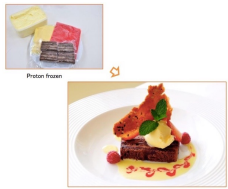
VEGETABLES



FRUITS



BAKERY



PASTRY



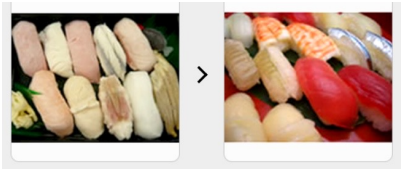
DAIRY PROD.



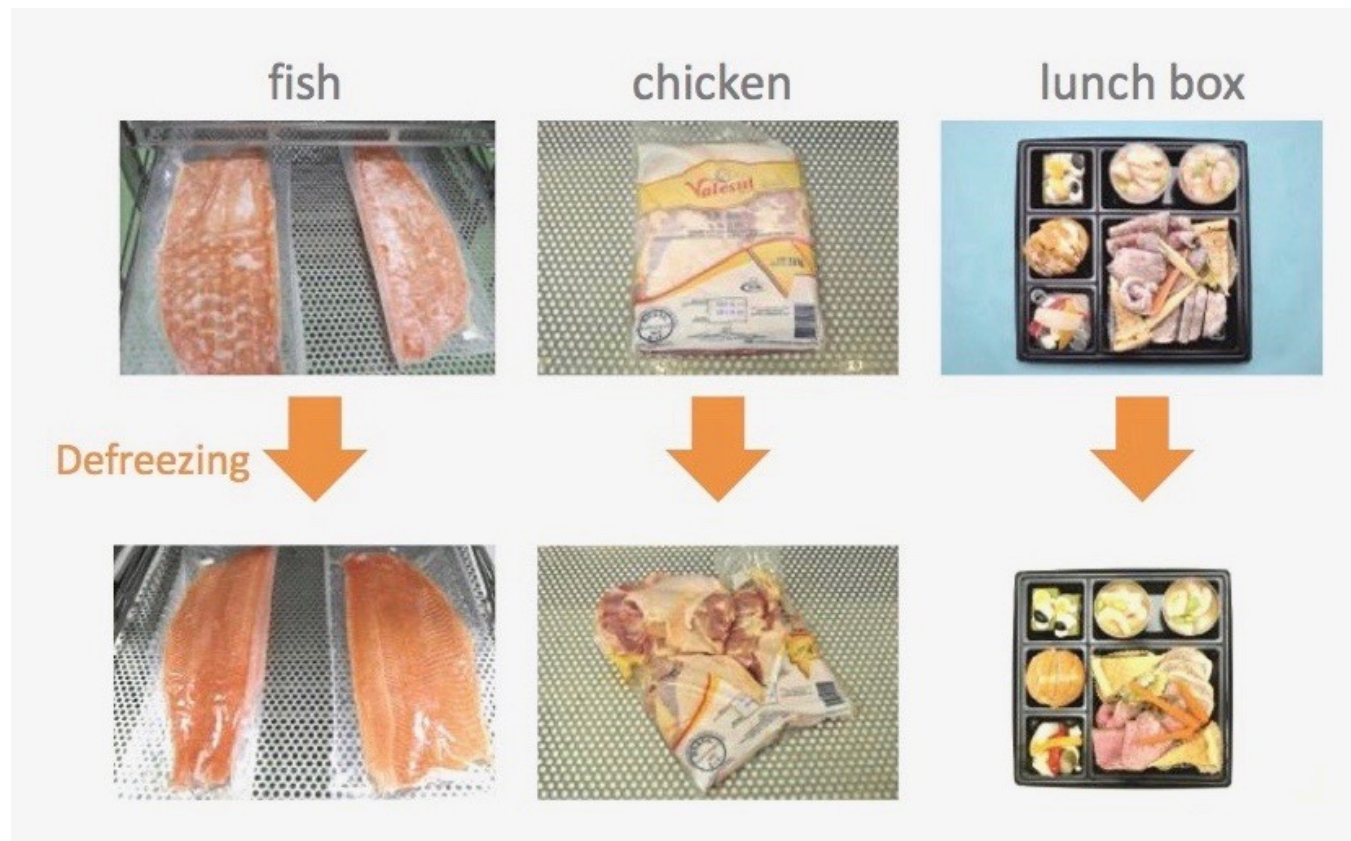
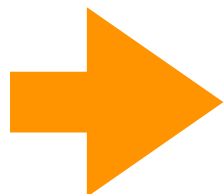
IV RANGE SEASONAL PROD.



HIGH VALUE PROD.



SUSHI



RESTAURANTS WITHOUT KITCHEN "PROTON DINING"

In Japan and recently in China, Malaysia and Korea restaurants are being developed where they have no kitchen.

They are called "PROTON DINING" (www.proton-dining.com).

In these restaurants it only regenerates, defrosting all dishes with FUSION DEFROSTER and placing previously cooked and magnetically frozen dishes in a central kitchen, which offers them ample room for maneuver due to the decrease in investments (saving investment in cooking) and processing costs and kitchen staff.



Overview of Proton Dining Business

a) To provide Know-how of operating a restaurant based on Proton equipment and frozen foodstuff



Proton Dining in Nara



Rockyaon Dining in Nara-Saho Univ.



Rockyaon Dining in Dalian China



b) To supply more than 500 items developed at Rockyaon Dining



2012 Special Gift of Hankyu Department Store
Bouillabaisse of fresh seafood of which foodstuff
were directly shipped from local producer

All of seafood (ex. prawn, squid, red sea bream)
were frozen in local production areas. After
cooking in Rockyaon, shipped with proton frozen

c) To operate a kitchen without chef



RESTAURANTS WITHOUT KITCHEN "PROTON DINING"

EJAMPLOS of defrosting made in the restaurant PROTON DINING ”.

In this restaurant, all the knowledge and experience are being applied to serve a French menu consisting of various dishes, all defrosted with the FUSION DEFROSTER defroster.

DEFROSTING SUSHI

Defreezing experiment of Sushi :

20 minutes at 40 °C

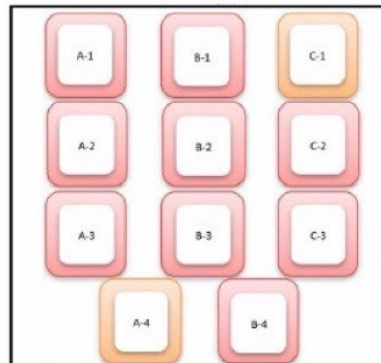


Picture at frozen



Picture at defrosted

position of trays



red: sushi fish topping

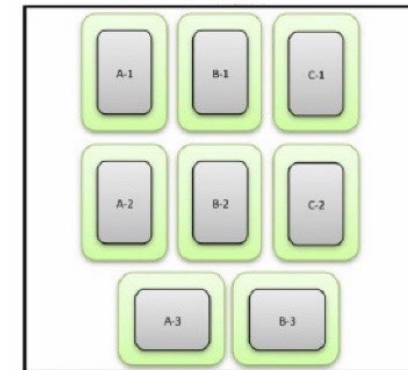


Picture at frozen



Picture at defrosted

position of trays



green : rice balls

Defreezing experiment of French menu :

20 minutes at 40 °C

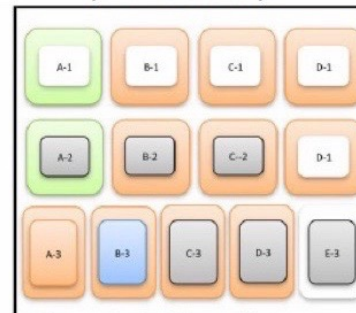


Picture at frozen



Picture at defrosted

position of trays



green : assorted vegetables beside beef stake

blue : Duck confit

orange : baked salmon with peppers

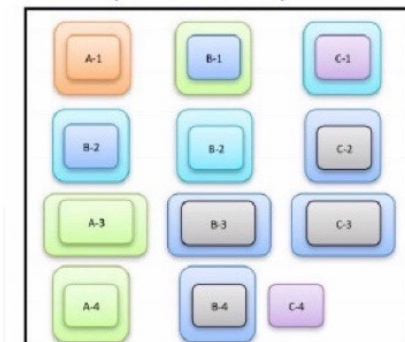


Picture at frozen



Picture at defrosted

position of trays



red : beef stake

A-3, B-3, C-3 → with side vegetables

DEFROSTING FRENCH MENU

FUSION DEFROSTER RANGE

LOW CAPACITY FUSION DEFROSTER DEFROSTERS

Defrost fast , without losing flavor!!

High quality Defreezer

Proton Defreeze
Fushigi-na *New!*
kinoko Movable type

Latest Defreezing Technology Proton Defreeze

Keep the flavor
[Restore the flavor to before freezing]

Keep the color
[Restore the color of the food to before freezing]

Keep the savor
[Defrost without losing savor]

Movable proton Defreezer that allows frozen foods to defrost in best form ever!



FUSION DEFROSTERS HIGH CAPACITY DEFROSTERS

The range of FUSION industrial defrosters is based on an expandable system according to customer needs, increasing the number of defrosting cars.

The base is the 1U4C model with 4 cars and a defrosting capacity of 500 kg.

Multiplying the number of machines and cars can increase capacity to cover all your needs.

The most used models in Japan are:

- 1U8C for a defrosting capacity of 1,000 kg.
- 1U16C for a defrosting capacity of 2,000 kg.
- 1U24C for a defrosting capacity of 3,000 kg.

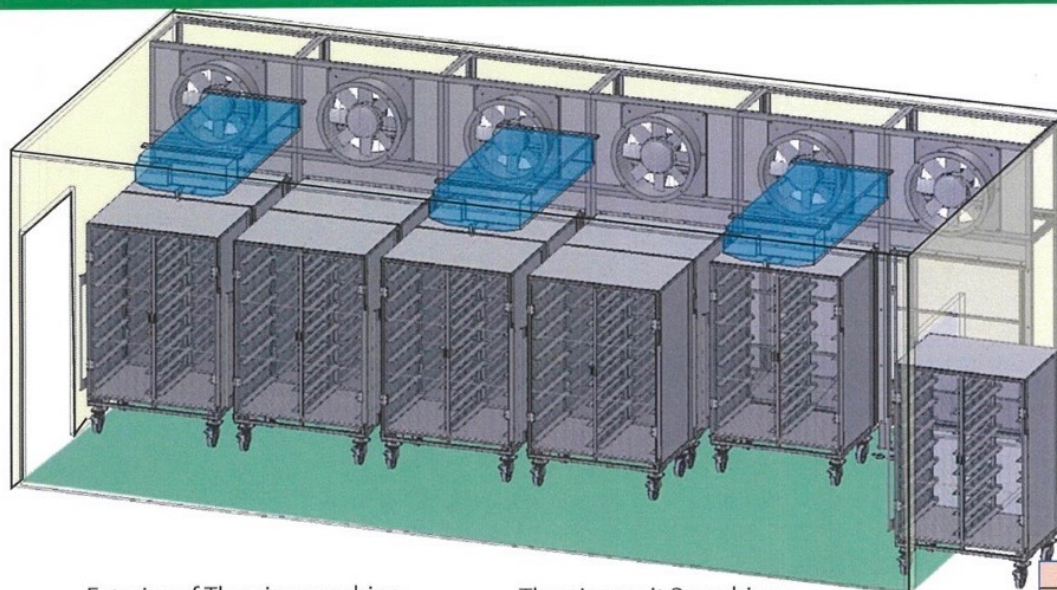
Model		BF-3215(1U4carts)	BF-3229(2U8carts)	BF-3243(3U12carts)
Type		4carts,500kg/B	8carts,1000kg/B	12carts,1500kg/B
External dimensions	frontage	3200	3200	3200
	Depth	1500	2900	4300
	height	2500(500above the ceiling)		
Thawing process	The first step	Frozen storage:「0℃~-8℃+timer function」		
	The second step	Thawing process:「15℃~28℃+timer function」		
	The third step	Thawing process:「15℃~28℃+timer function」		
	The fourth step	Refrigerated storage:「-2℃~-5℃」		
Capacitance	Indoor	3Φ200v 4kW	3Φ200v 5kW	3Φ200v 8kW
	Outdoor	3Φ200v 2.2kW	3Φ200v 2.2kW	3Φ200v 3kW
Steam amount max , size		0.2MPa 40kg/h	0.2MPa 80kg/h	0.2MPa 120kg/h
		25A	25A	32A
		With drainage inside the room		
Option	Exclusive cart	4 truck warehousing	8 truck warehousing	12 truck warehousing
	Exclusive tray	64 sheets(16 sheets/cart)	128 sheets(16 sheets/cart)	192 sheets(16 sheets/cart)
	Steam filter	For rust or edible		

Proton Thawing Machine Truck type

Proton Thawing
Patent No 4535341

"Chunk of 60 pound meat" can also be thawed overnight!

**Decompression scale
2 Trucks ~ large capacity**



- High humidity of patented technology.
The use of latent heat makes the thawing speed faster.
- Proton is the only thing Chunk of 60 pounds can be thawed overnight.
- The yield rate and profit improves.
- It is possible to set the temperature program suitable for the thawed product.
- After thawing,
it can be used as a refrigerator.
- Outstanding cleaning capacity.r.

Thawing program know-how

Process 1 : Frozen storage
Process 2 : Thawing process
Process 3 : Thawing process
Process 4 : Refrigerated storage

Exterior of Thawing machine



Thawing unit 2machines



Model	BF-3215(1U4carts)	BF-3229(2U8carts)	BF-3243(3U12carts)
Type	4carts,500kg/B	8carts,1000kg/B	12carts,1500kg/B
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Capacitance	Indoor	3 Φ200v 4kW	3 Φ200v 8kW
	Outdoor	3 Φ200v 2.2kW	3 Φ200v 3kW
Steam amount max , size		0.2MPa 40kg/h	0.2MPa 80kg/h
		25A	32A
Option	Exclusive cart	4 truck warehousing	8 truck warehousing
	Exclusive tray	64 sheets(16 sheets/cart)	128 sheets(16 sheets/cart)
	Steam filter	For rust or edible	

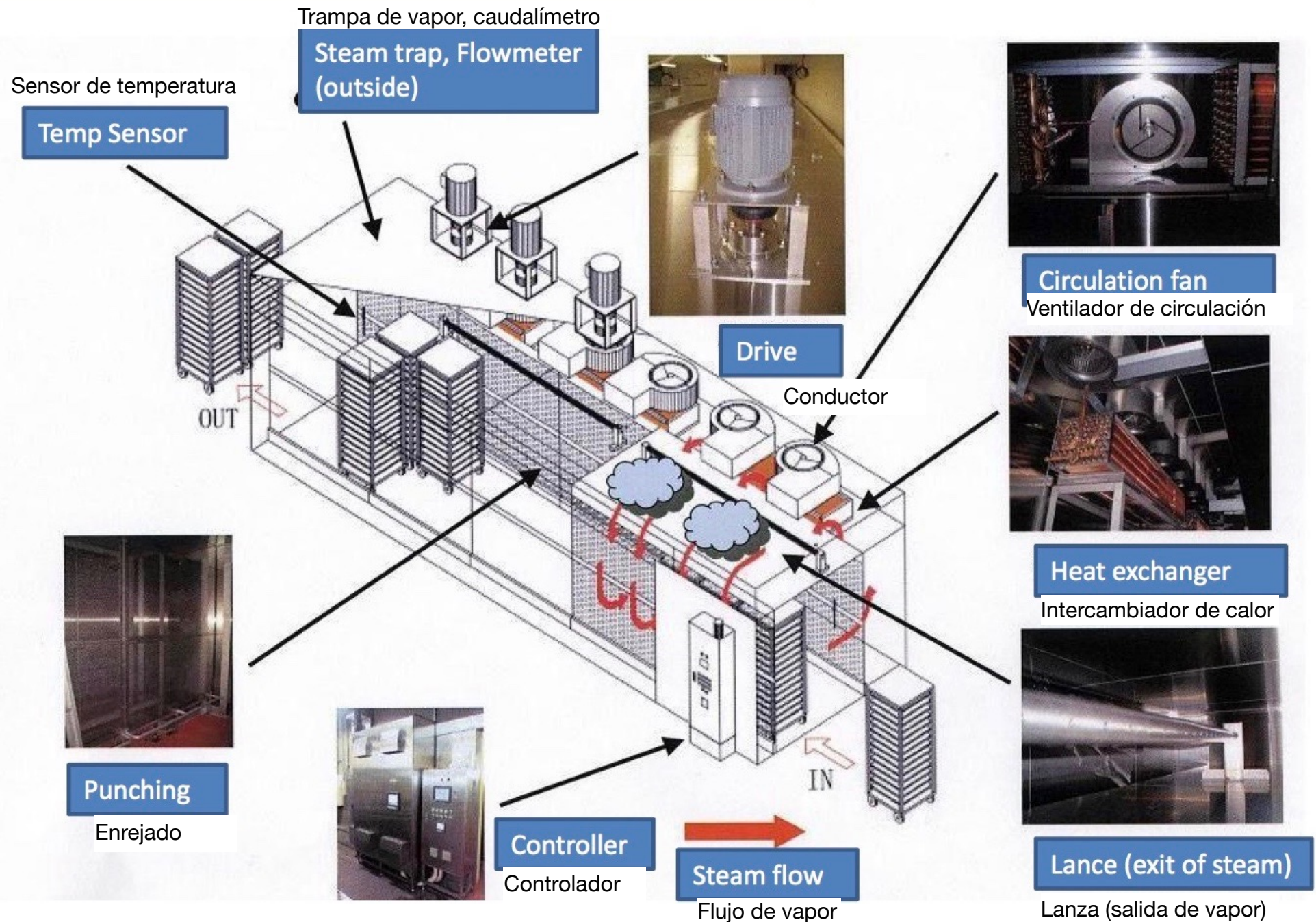
- Alta humedad de la tecnología patentada.
- El uso del calor latente hace que la velocidad de descongelación sea más rápida
- FUSION DEFROSTER es el único que puede descongelar un trozo de carne de 60 libras durante la noche.
- La tasa de rendimiento y el beneficio mejora.
- Es posible configurar el programa de temperatura adecuado para el producto descongelado.
- Después de descongelar puede ser utilizado como un refrigerador
- Excelente capacidad de limpieza.

images BF- 3215 at stop



CONFIGURATION DEFROSTER FUSION HIGH CAPACITY

Configuration of large defreezer

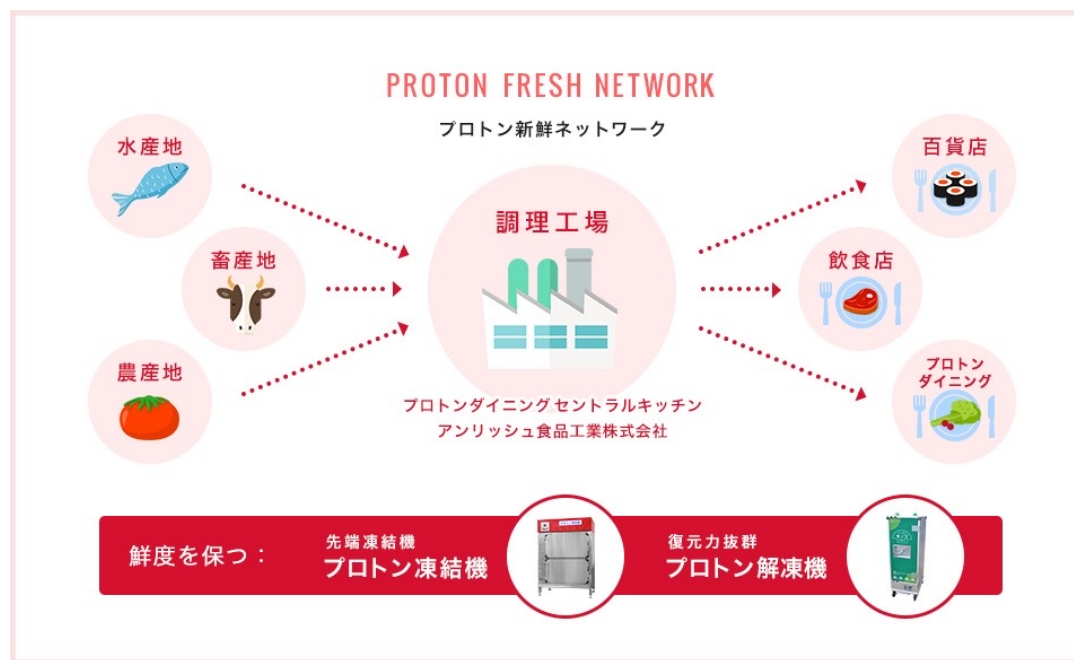


BF-3215 images in operation

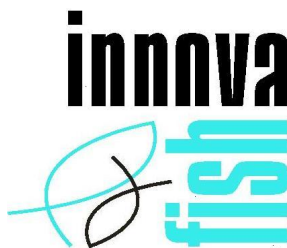
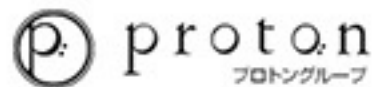


BF-3215 images in operation





JAPÓN NO SE EQUIVOCA. APROVECHESE VD. TAMBIÉN DE TODAS LAS VENTAJAS



proton-
EUROPE

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