HybridICE

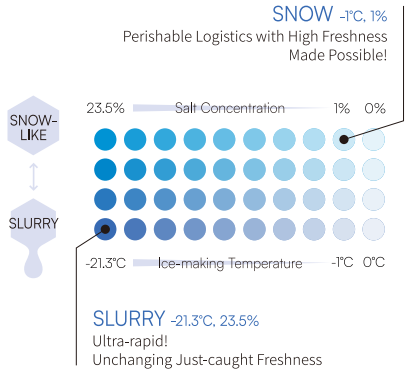
Customize Ice from Freezing to Refrigeration with Next-Generation Ice-Making Technology

HybridICE allows for ice production using a high-concentration brine solution with 23.5% salinity, which was previously considered as an "antifreeze". This enhances quality and efficiency in storage and transportation.

1

Ice Shape And Temperature Can Be Customized

By adjusting the salinity of the water used for ice-making, it is possible to produce ice suitable for various applications, from freezing to refrigeration temperatures. This allows for optimal use tailored to each type of ingredient.



2

No Cell Damage Occurs

Freezes without dripping, preserving the umami components of foods.

By performing ultra-rapid freezing at -21.3° C, the ice crystals quickly pass through the temperature range where they form (-1°C to -5° C). This allows for freezing without cell damage.

Rapid freezing reduces the cooling time.

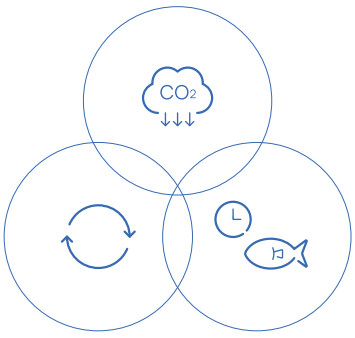
Ice at sub-zero temperatures has an extremely high thermal conductivity, transferring heat at rates 100 times more efficiently than air and 10 times more efficient than ethanol.

Note: The thermal conductivity values are as follows:
Ice: 2.2 W/mK
Water: 0.569 W/mK, ethyl alcohol: 0.183 W/mK, air: 0.02 W/mK

3

Excellent Sub-Zero Temperature Retention

With HybridICE, you can transport it without using electricity. Ice requires a large amount of heat (latent heat of fusion) when melting and therefore remains at low temperatures for long periods of time without the use of electricity.



Sustainable

Reduction of CO_2 Emissions

- Reduced energy consumption through efficient freezing and refrigeration processes
- Transition from dry ice to rapid freezing with HybridICE

Recyclable

- Seawater can be utilized to make the ice.*1
- Saltwater can be reused
- No environmental impact or disposal restrictions*2

Reducing food loss by extending shelf life

- Long-term freshness retention*3
- Extended storage through rapid freezing (up to 5 years)

*1 When using seawater (approx. 3% salinity), it is necessary to adjust the salinity to the appropriate level (add water to reduce salinity or add salt to increase it) according to the temperature range of the HybridICE you wish to use, and remove any debris and E. coli bacteria.
*2 The above is applicable for use in Japan; regulations may differ depending on the country.
*3 As compared to refrigeration that is usually done above 0°C, refrigeration at sub-zero temperatures (throughout all stages of cooling, transport, and retail for seafood) allows for longer-term preservation.

Frozen seafood

produced by FrostiX

From catch to serving, consistent low-temperature management with minimal energy use

Consistent low-temperature management plays a crucial role in ensuring freshness and high-quality distribution.

Long-term preservation of freshness

- Temperature control to suit the various fish species
- Prevents deterioration of appearance, such as damage or color changes
- Long-term storage by rapid freezing (up to 5 years)

Operational Efficiency and Streamlining

- Consistently provides high-quality processed products
- Makes it easier to handle processed goods without the need for specialized expertise, leading to improved production efficiency

Hermetic Seal Packaging

- The GL barrier film used in the packaging is also expected to have the following effects

Tuna: -60°C storage, colour change inhibited.
Scallops: -15°C storage, suppresses changes in ph-value.

Cost Reduction

- Reduced loss of raw materials due to long-term storage by rapid freezing
- Contributes to reduction of raw material costs

Innovations in the Food and Beverage Industry

Availability of fresh foods Even in Off-Season periods

With HyridICE technology, fresh foods can be preserved for a long period of time, regardless of season. This ensures a stable supply of fresh produce and popular menu items, even during the off-season periods.

Offering High-Quality Menus and Reducing Stocking Loads

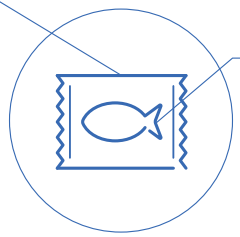
By consistently providing menu items made with fresh ingredients, customer satisfaction can be enhanced.Additionally, the ability to maintain quality while enabling long-term storage reduces the frequency of procurement, there by cutting costs and labor.

Achieving a Sustainable Society

FrostiX aims to create a sustainable society via 2 approaches: packaging technology and freezing technology.

Packaging Technology: GL BARRIER Film

- Reduction of food loss
  Reduction of food loss by extending shelf life
- Reduction of plastic use
  Replace plastic moldings without changing the barrier properties
- Reduce CO_2 emissions
  CO_2 emissions can be reduced by optimizing packaging material composition
- Environmental Considerations
  Produces minimal residue and zero harmful gases upon incineration



Freezing Technology: HybridICE

Reduction of food loss by extending shelf life
Long-Term Freshness Retention*1
- Long-term storage by rapid freezing (up to 5 years)

*1 Compared to refrigeration above 0°C, refrigeration at sub-zero temperatures (throughout all stages of cooling, transport, and retail for seafood) provides better freshness retention.

FrostiX

BE PRIME,
MAKE POSSIBLE.

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