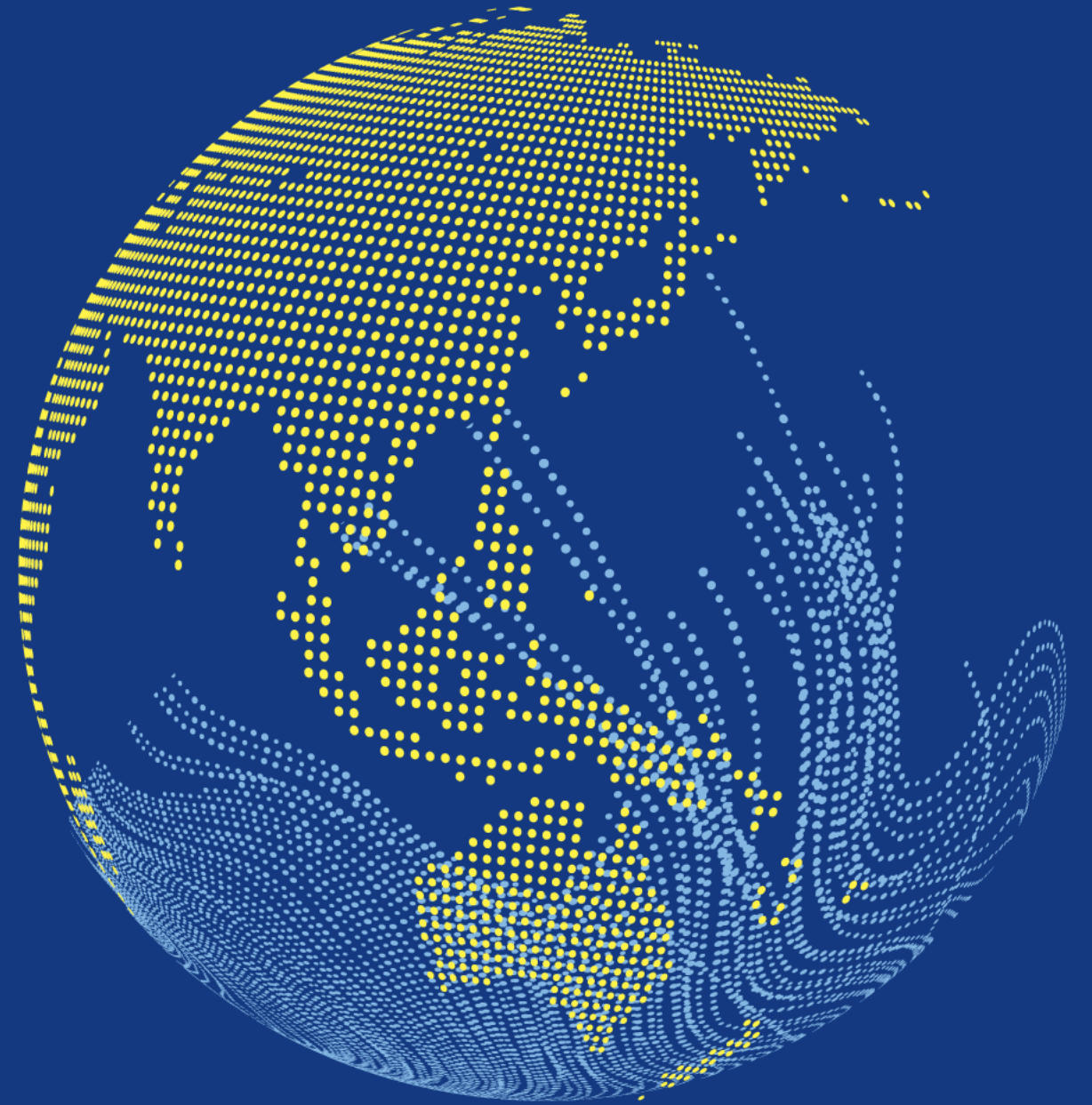




JAPAN

Business Case for
Natural Refrigerants



12/02/2019

TOKYO



CO₂ Ice Bank

Answer to the next requirements

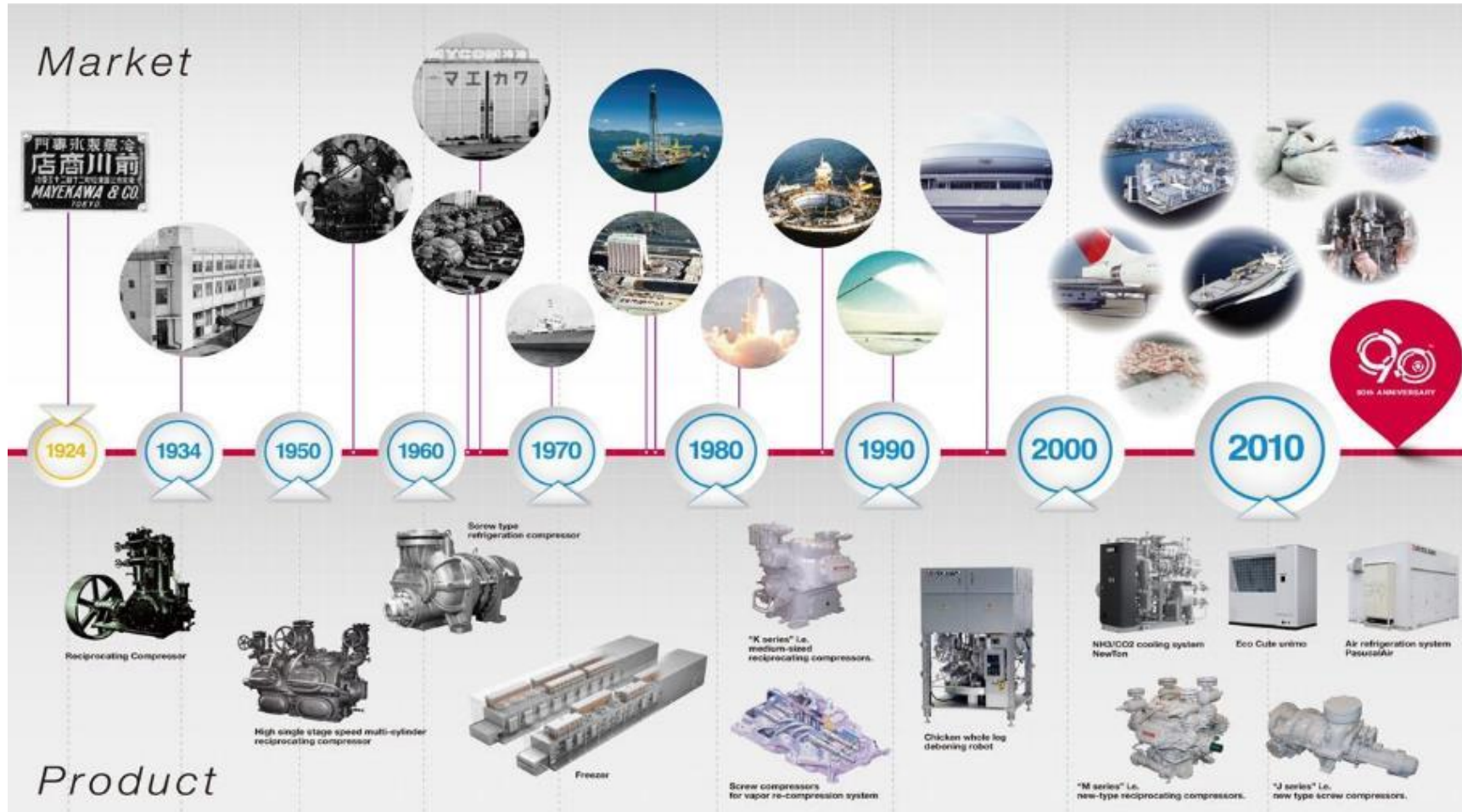
2019. 2. 12

HIDERHIRO KITAYAMA

MAYEKAWA MFG.CO.,LTD.

Mayekawa's Development

Mayekawa started as a manufacturer of refrigeration equipment, and expanded its scope to processing and system designs



Current status and Futures of Natural Refrigerant system

Many equipment using natural refrigerant are introduced in the market, but the applications are limited to low temperature refrigeration. In many applications, the conversion to the natural refrigerant is difficult. The main reason is the limited variety of equipment compatible with natural refrigerant. Mayekawa focus on the development of new equipment that will expand the range of natural refrigerant applications.

Possibilities are boundless, such as industriaies shown below and air conditioning



Logistics



Oil, Gas & Chemical



Food



Breweries



Dairy



Beverages



Environment



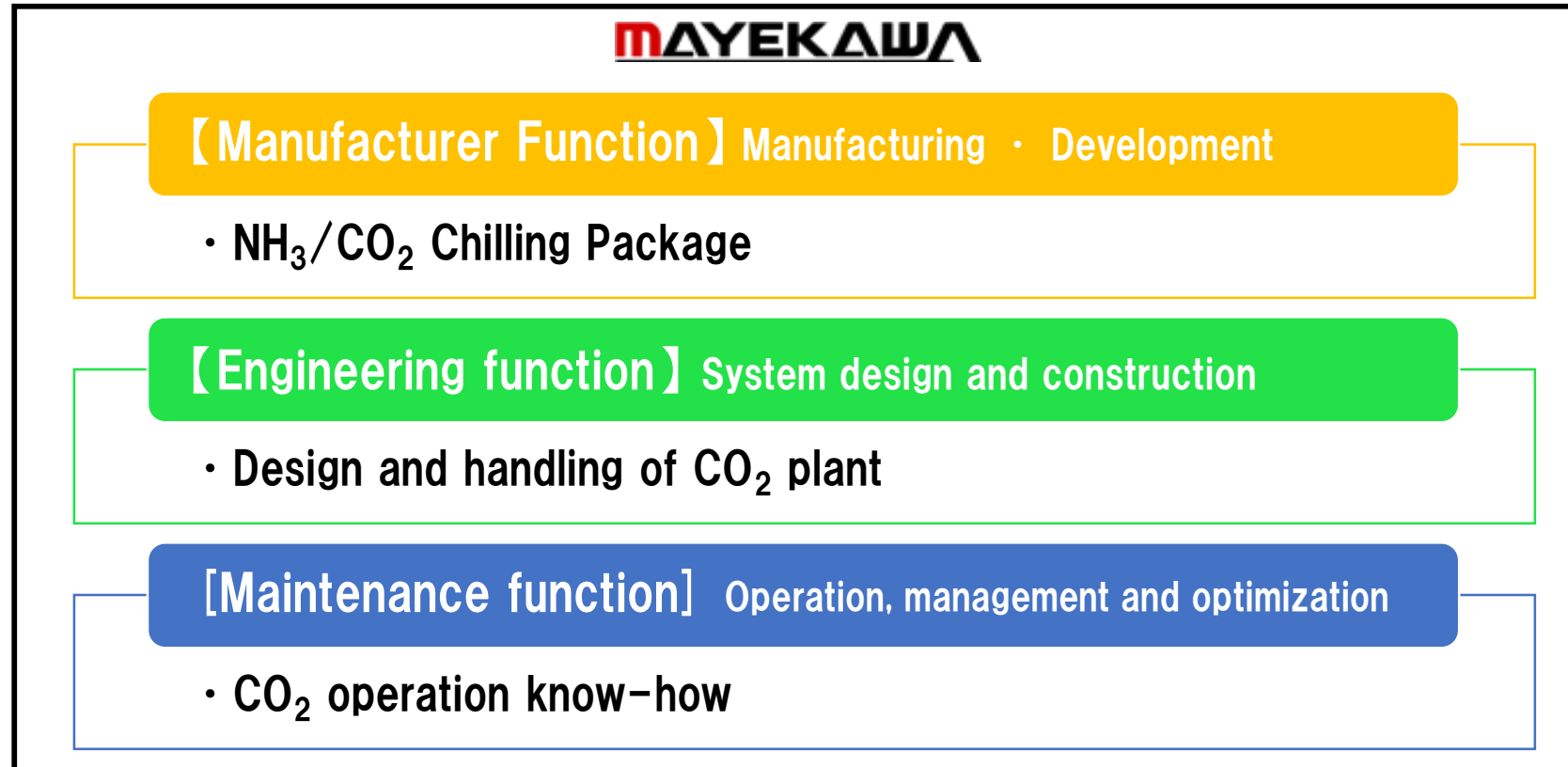
Leisure



Marine

To the next stage of Natural refrigerant

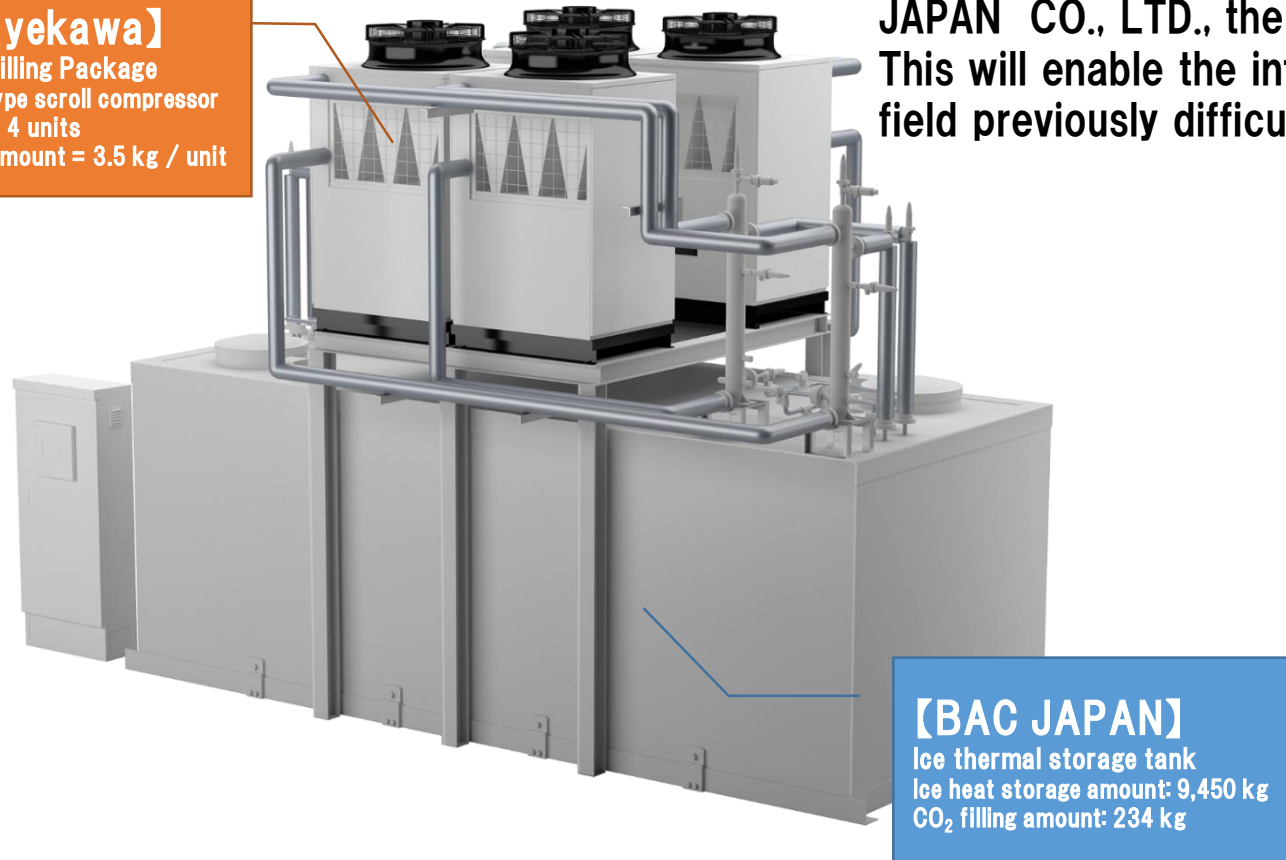
To reduce CO₂ emission, Mayekawa considers it is essential to increase the applications of natural refrigerant, and is developing variety of equipment with its technological expertise and years of experience in the natural refrigerant,



CO₂ Ice Bank

CO₂ Ice Bank is one of applications using CO₂ refrigerant. It is the fruits of the collaboration between Mayekawa and BAC JAPAN CO., LTD., the leading manufacturer of Ice Bank. This will enable the introduction of CO₂ refrigerant technology to the field previously difficult to apply.

【Mayekawa】
NH₃/CO₂ Chilling Package
Half-closed type scroll compressor
SIERRA-A × 4 units
NH₃ charge amount = 3.5 kg / unit



【BAC JAPAN】
Ice thermal storage tank
Ice heat storage amount: 9,450 kg
CO₂ filling amount: 234 kg



Advanced CO₂ refrigerant Technology.
Production · Design · Construction · Maintenance · Abundant achievements



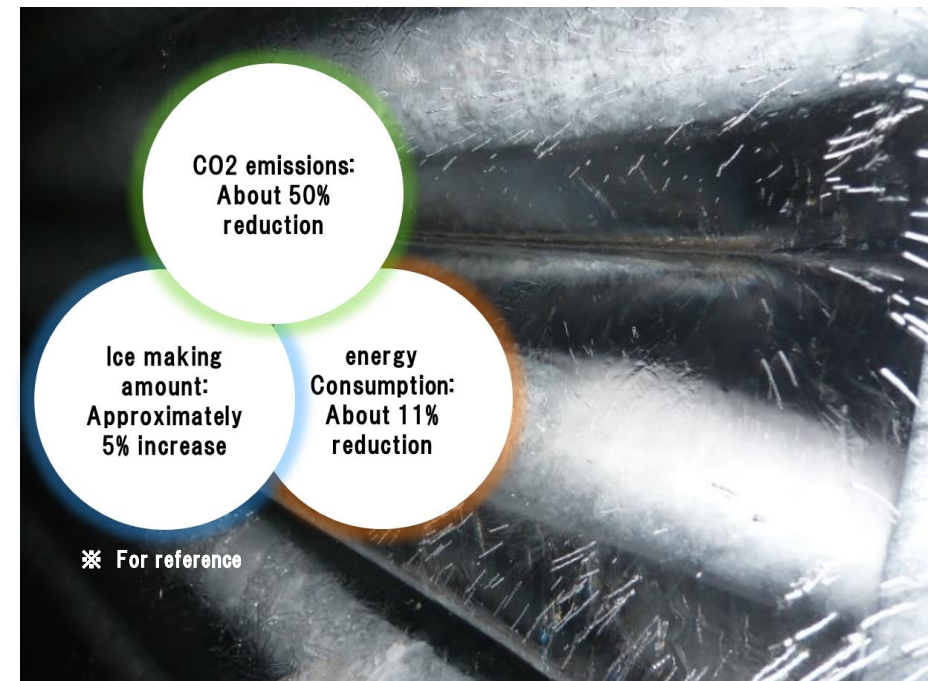
BAC JAPAN CO.,LTD.

Advanced Ice Bank Technology.
Design · manufacturing · operation know-how · abundant achievement

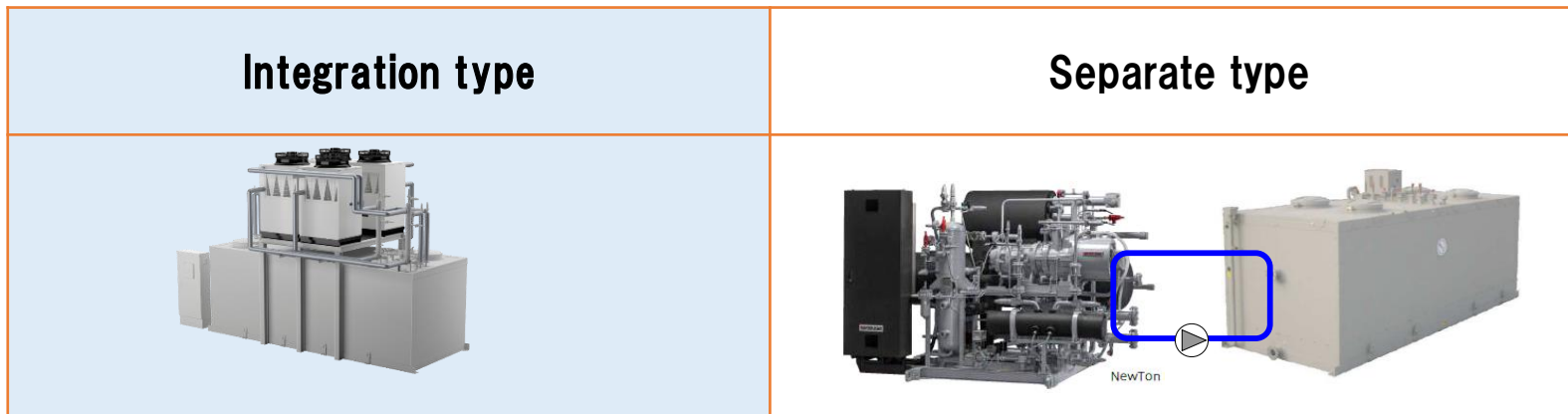
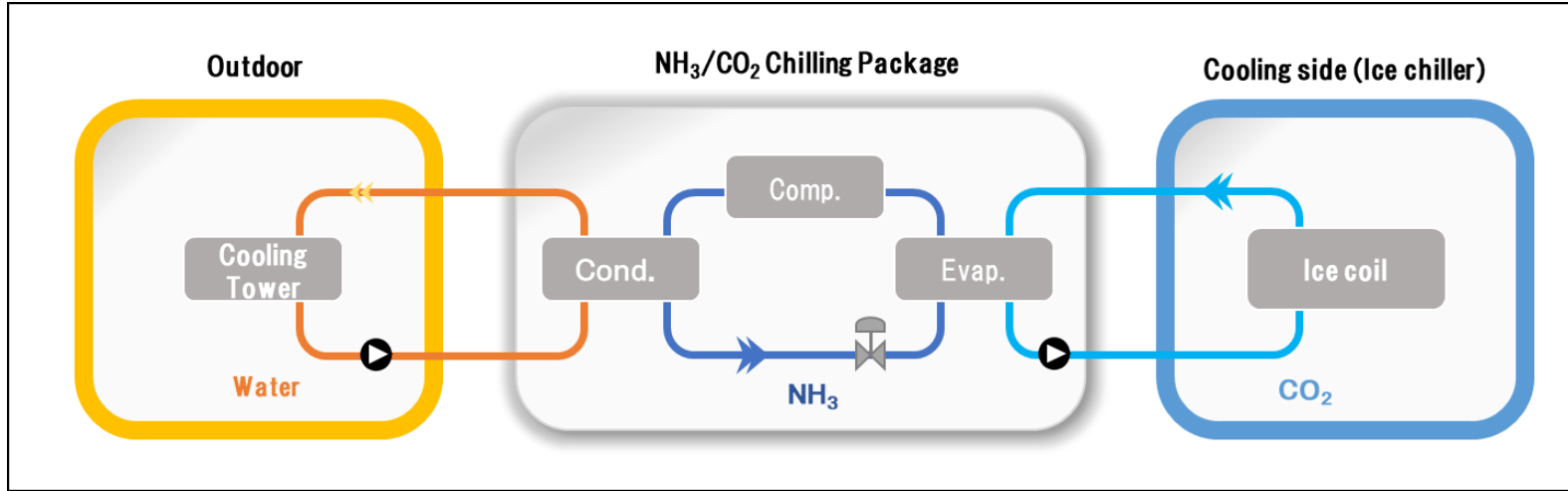
Features of CO₂ Ice Bank

- Non-Freon Environment Friendly System
- Efficient utilization of the heat transfer surface of the coil
- High performance with uniform cooling and high evaporating temperature
- Ensured uniform ice build up on all over the coil
- No oil, no deterioration of performance
- No contamination of the chilled water in case of unlikely event of refrigerant leakage from the coil.

- Conventional ice banks use R22 refrigerant or its alternative HFC refrigerant, that are inherently injurious to environment.
- CO₂ Ice bank eliminates the inherent difficulty of CO₂ refrigeration system by adopting the revolutionary CO₂ secondary refrigerant system.



CO₂ Ice Bank system outline



Application and specification of CO₂ Ice Bank

Various industrial chilled water

Load leveling by thermal storage

Chilled water for air conditioning

Demand cut of daytime power by nighttime thermal storage

For any chilled water requirement



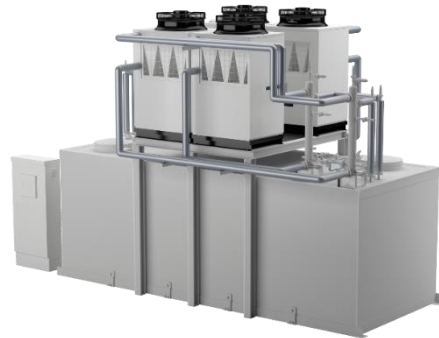
Dairy ▪ Beverage



Food ▪ meat



air conditioning



12/02/2019 - Tokyo, Japan

CO₂ ICE Chiller Specifications

※For reference

Model	TSU-125R-CO2		TSU-250R-CO2		TSU-500R-CO2	
Outer dimensions (mm)	W5,830×L1,320×H2,150		W5,830×L2,320×H2,150		W11,070×L2,320×H2,150	
Ice thermal storage amount (kg)	4,725		9,450		18,900	
Unit type	SIERRA-A	SIERRA-W	SIERRA-A	SIERRA-W	SIERRA-A	SIERRA-W
Number of SIERRA (units)	2		4		8	
Ice making capacity (kW)	42	45	84	90	168	180
Power Consumption (kW)	19.8	17.6	39.6	35.2	79.2	70.4
CO2 Charge (kg)	117		234		469	
Number of NewTon-CH (units)	-		1		2	



Business Case for
Natural Refrigerants

**Thank you
for listening.**

