



FoodPro 2023

**Addressing Food Safety & Spoilage
Concerns with Cryogenics**

Air Liquide Australia

A world leader in gases, technologies, and services for...

INDUSTRY

**Sustainable solutions
for a wide range of
industrial processes
of our customers**

(energy, metals, food, chemicals,
automotive, pharmaceuticals, etc.)

and for transports

HEALTH

**Patients at home
Hospitals Specialty
ingredients**

Air Liquide in Australia



400+ Agents

14 ASU / CO² Production plants

28 Sites

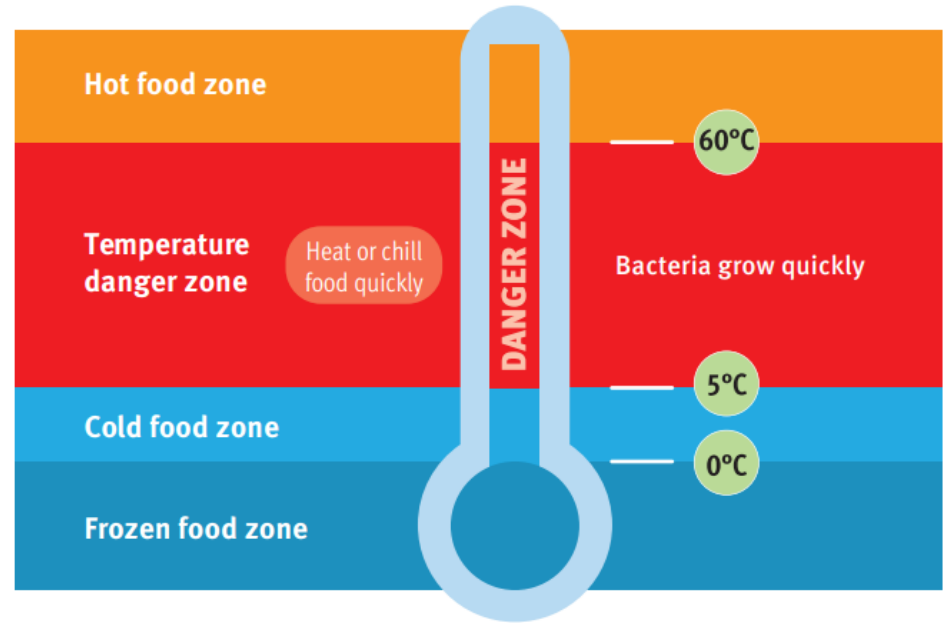
What is Cryogenics?

Harnessing the extremely **cold properties of Liquid Nitrogen (-196 C) and Liquid Carbon Dioxide (- 78 C)** to chill or freeze foodstuff via direct contact.



How does cryogenics address food safety issues and spoilage concerns?

- + **Allow fast Chilling** to get through the **danger zone** in less than 2 hours to **minimize bacterial growth**.
- + **Allow precise temperature control** to counteract heat that is generated during processes such as grinding, mixing, etc. in order to **minimize bacterial growth**, etc.
- + **Extended shelf life** for frozen product while **maintaining structural integrity and organoleptic properties of the food**



Advantages of using Cryogenics

+ Improvement in Product Quality,

- ✓ Slowing down bacterial activity
- ✓ Reduce dehydration and drip loss:
Smaller ice crystal
- ✓ Reducing food loss

+ Unlock new process possibilities and recipes (complex, fragile, multi-layer, etc)

- ✓ Crust freezing, hardening, Ice Cream coatings..

+ Extend production capacity

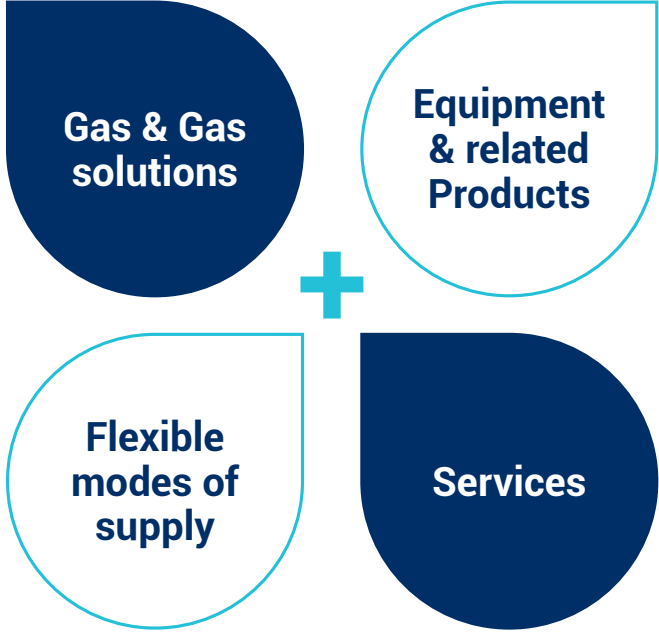
- ✓ Reduced freezing time = higher output
- ✓ Supplement existing capacity to enhance production

+ Small food print

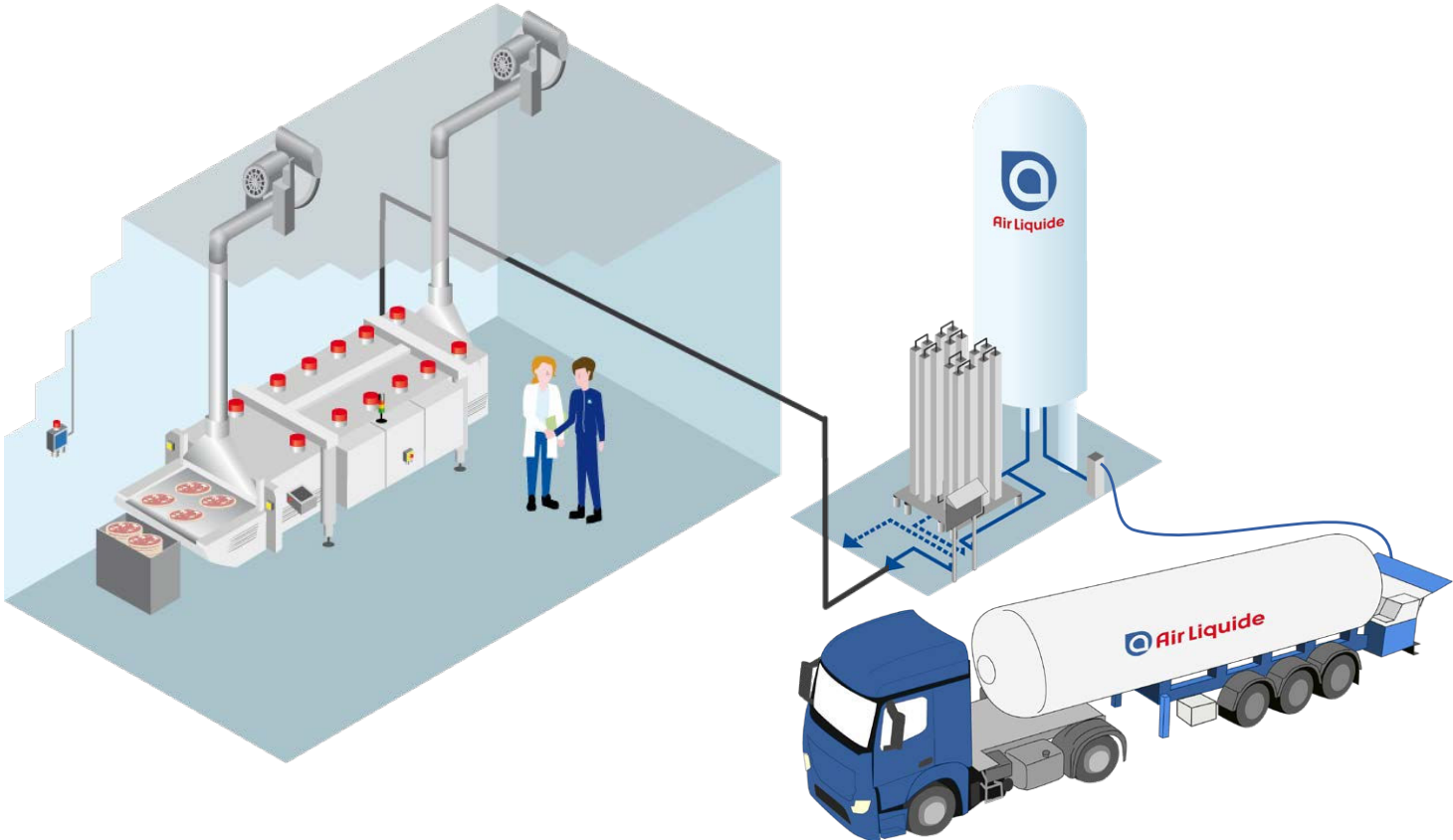
+ Improve Process Flexibility

+ Reduce operational costs, energy and maintenance compare to mechanical

What is the Air Liquide Freezing & Chilling Solution?



Principle of tunnel freezer



What is the Air Liquide Freezing & Chilling Solution?

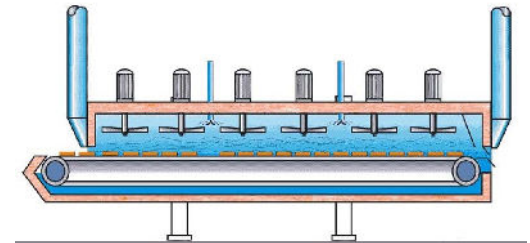
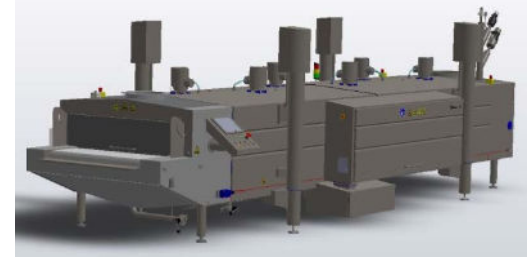
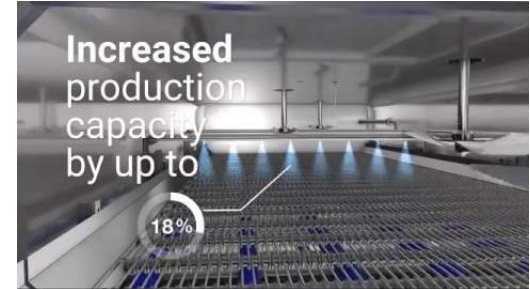
#	Gas Application	Meat	Poultry	Fish & Seafood	Fruits & Veg.	Bakery	Dairy	Prepared Meals
1	Chilling	X	X	X	X	X	X	X
2	Freezing or Crust Freezing	X	X	X	X	X	X	X
3	Crust Freezing before Slicing/Dicing	X	X	X		X	X	
4	Crust Freezing before Glazing			X				
5	Crust Freezing for Hardening					X	X	
6	Coating of IQF products				X			X
7	IQF of Liquid Pellets						X	

APPLICATION EQUIPMENT: α solution for every need

CRYO TUNNEL - FP1

In-line freezer - Up to 1500 kg/hour

- Versatility to efficiently **chill, freeze, crust freeze or harden**
- Designed by Air Liquide based on the latest hygiene guidelines from EHEDG and the USDA
- Improved performance and operational efficiency
- Easily integrated into any continuous process
- Ideal for processors that need increased productivity vs. mechanical solutions
- Minimal capital investment and installation cost.
- Uses ALIGAL 1 or ALIGAL 2

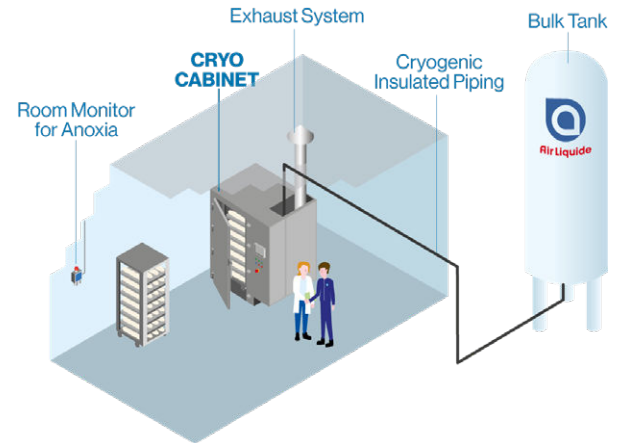


APPLICATION EQUIPMENT: α solution for every need

CRYO CABINET

Batch freezer - Up to 300 kg/batch

- Versatility to efficiently **chill, freeze, crust freeze or harden**
- Designed by Air Liquide based on the latest **hygiene** guidelines from EHEDG and the USDA
- Easily integrated into any batch process
- Ideal for processors that need increased productivity vs. mechanical solutions
- Minimal capital investment and installation cost
- Uses ALIGAL 1 or ALIGAL 2 for **Food grade gas**

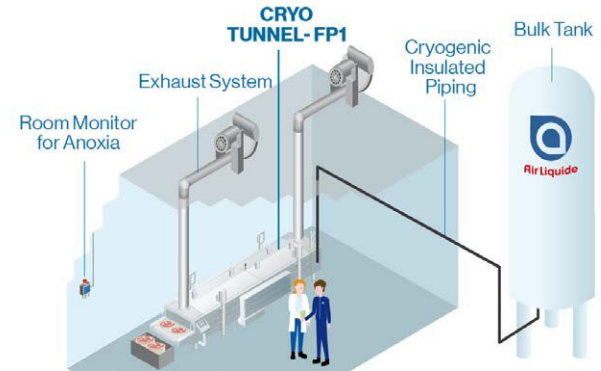


APPLICATION EQUIPMENT: a solution for every need

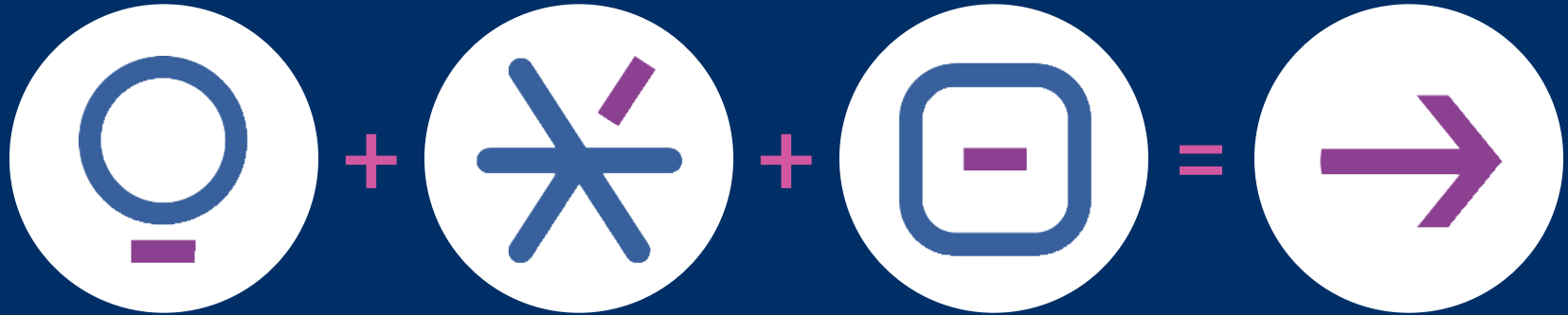
CRYO TUNNEL – MP1

In-line freezer - Up to 2500 kg/hour

- Versatility to **individually quick freeze** smaller, uniformly sized food products using three belt tiers
- Ideal for medium to large processors that require higher freezing capacities in a smaller footprint
- Easily integrated into any continuous process
- Minimal capital investment and installation cost.
- Uses ALIGAL 1 or ALIGAL 2



Driving your Performance to the next level



GAS

- ▶ ALIGAL™
- ▶ Supply Management
- ▶ Certified QMS (ISO9001, FSSC22000)

PROCESS EXPERTISE

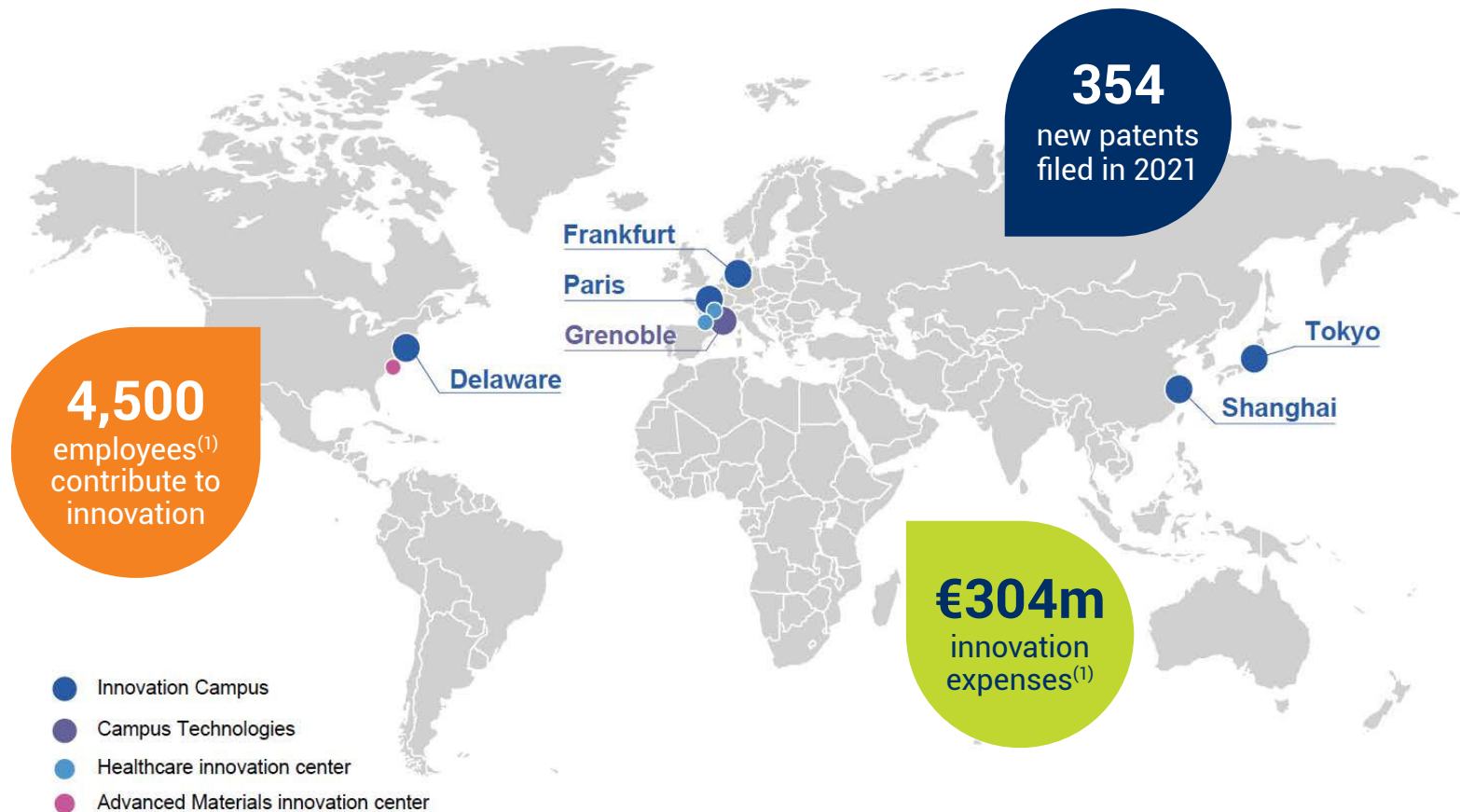
- ▶ Solution Design
- ▶ Installation
- ▶ Commissioning
- ▶ Troubleshooting
- ▶ Worldwide network

APPLICATION EQUIPMENT

- ▶ CRYO CABINET
- ▶ CRYO TUNNEL range
- ▶ CRYO INJECTOR
- ▶ ...

DRIVING YOUR PERFORMANCE

An Innovative Group



INNOVATION CAMPUS TOKYO

12 Laboratories



6 industrial
test platforms

Combustion - Heat treatment -
Food processing - Welding -
Surface treatment - Rubber
deflasher



100
people on the Campus

Diversity, Expertise, CSR



The campus also relies on teams based at Yonsei University (South Korea) and Taiwan.

Q&A

Come visit us at
Booth L23
to discuss your
specific food safety
and production
challenges.

