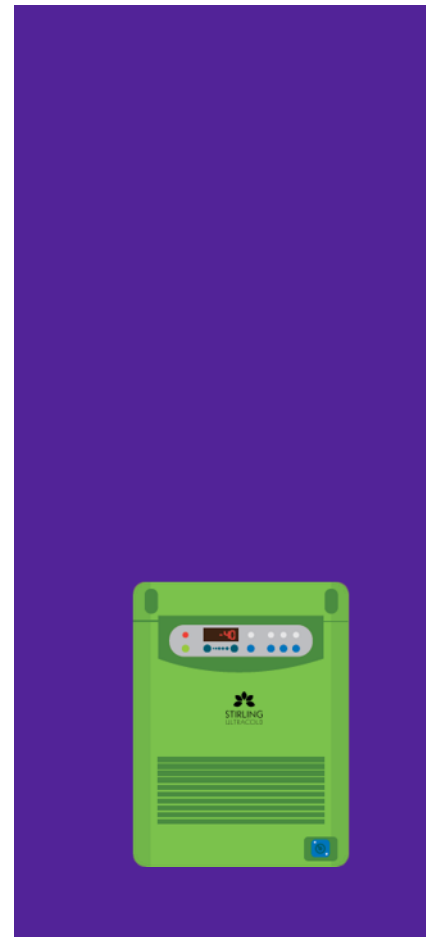
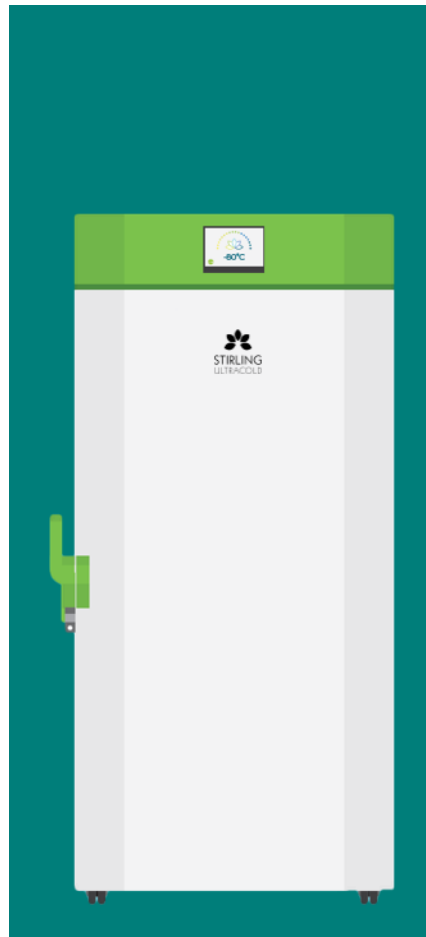




STIRLING[™]
ULTRACOLD

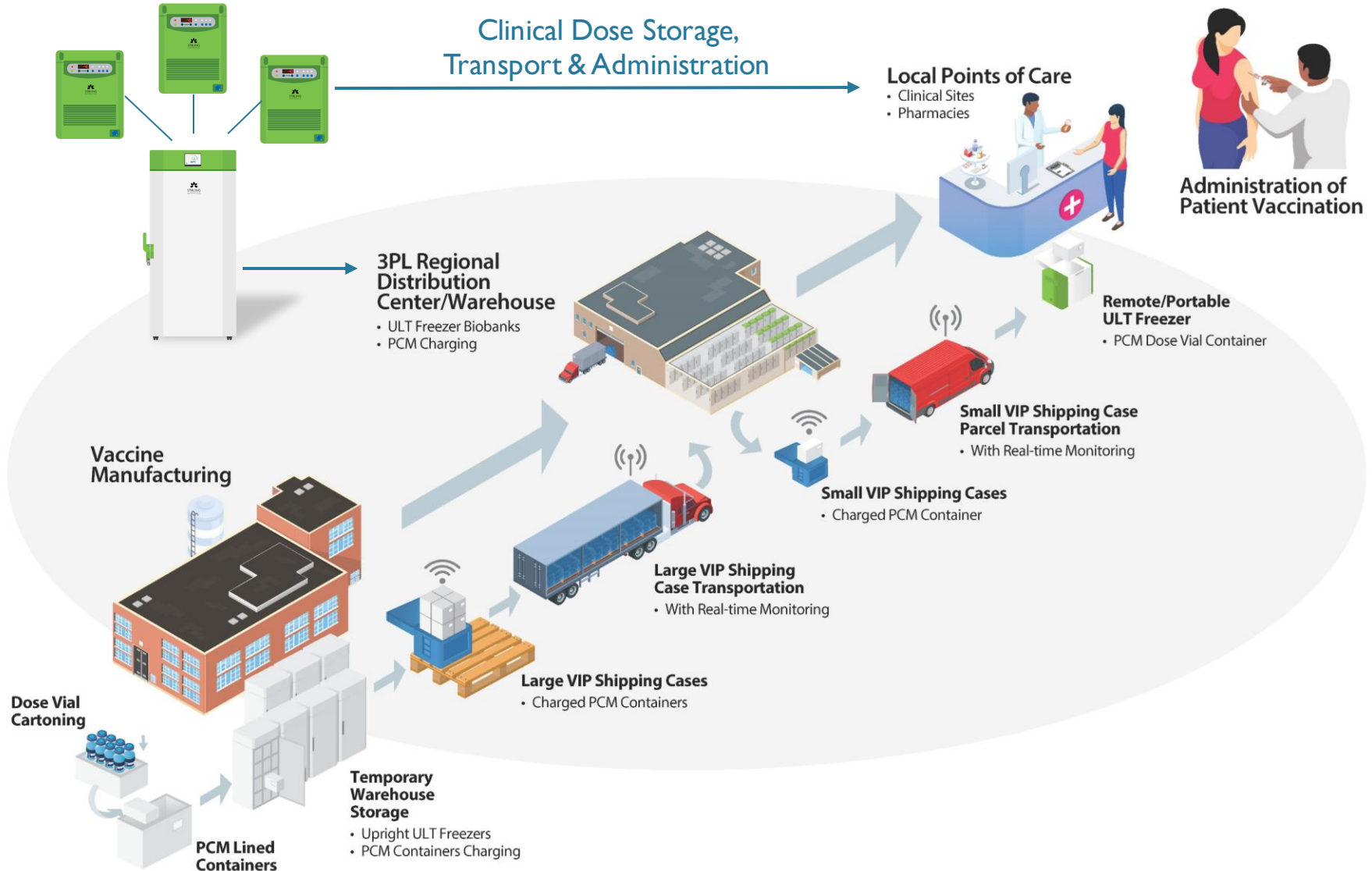
VACCINE
READY

stirlingultracold.com



**Cold Chain Logistics and Storage
Solutions for Vaccine Distribution**

ULT Cold Chain Distribution



The Stirling Ultracold Advantage

Size

- Smallest physical footprint, maximal storage capacity
- ULT25NEU weighs ~21KG
- ULT25NEU is small enough for cart transport

Power

- Universal plugs (120-240V - 50/60 Hz)
- ULT25NEU capable of operation on 12VDC or external battery
- High-performing with innovative & efficient Stirling Engines

Protection

- Securable storage
- Wide temperature range of thermal protection -20°C to -80°C
- No mechanical compressors to age or fail!

Sustainability

- 100% natural refrigerants
- Reduced energy consumption over legacy freezers



Advantages for Rapid Vaccine Cold Chain Deployment



SU780XLE

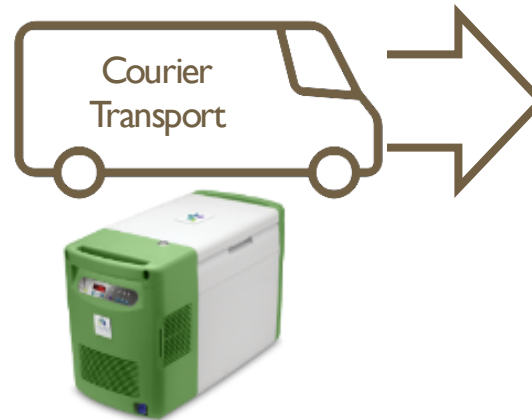
- Smallest facility and infrastructure footprint
- Reliable operation in the broadest range of conditions
- Building Management Integration
- Lowest cost of operation
- Holds

ULT25NEU

- Uniquely portable -80°C storage for clinical settings
- Long-term vaccine efficacy, monitored remotely
- Plugs in anywhere, worldwide
- Holds 1 bundle of Pfizer vaccines (5 boxes, 1232 vials)



Bulk Storage



PHARMACIES

Bulk Storage Distribution
Distribution Centers

Chemists and GP Clinics

Model ULT25NEU



*The world's ONLY portable
Ultra-Low Temperature freezer*

**Thermally protects leading COVID19 vaccines
requiring -20°C to -80°C storage**

- Easily adjust temp set point
- Holds ~6 | 60 Pfizer vaccine doses
- Chest style maintains -80°C even with the lid open
- Allows unlimited access to vaccines without warming
- Ideal for stationary and mobile inoculation sites

Additional market applications

- Biologic drug delivery
- Skin graft preservation & delivery
- Regenerative medicine
- Mobile, on site forensic DNA preservation

**Cloud-based, wireless temperature monitoring
and logging with SenseAnywhere**

ULT25 v. Dry Ice Comparison



Considerations	ULT25NEU	Dry Ice*
Required PPE	Gloves for handling frozen materials	Goggles or face shield, lab coat, loose-fitting thermally-insulated gloves
Personnel risks	None	Personnel burns, kills tissue cells& has caused asphyxiation
Ventilation Requirements	None	Dry-ice should always be stored in a well-ventilated area and personnel should wear CO2 monitors
Availability	2000+ units shipped globally – production increased 100% with responsive supply chain	Supply down 30% with fewer vehicles on the road and significant reduction in ethanol production
Power Requirements	Low power device – can be plugged in anywhere	None
Environmental Emissions	Closed system – no emissions	Dry Ice sublimates CO2 back into atmosphere
Sustainability	Long-term, maintainable solution	Avg. block has 24 hour working life
Precise Temperature Control	On-board computer with SenseAnywhere connectivity	None – evaporates and requires constant personnel monitoring – potential damage to vaccines with wide temperature excursions
Vaccine access	Convenient racking system, designed for quick and simple vaccine transfer	Requires digging through layers of dry ice safely
Storage Capacity	1800 2ml vials – est. 9000 doses	Depends on the size of the packaging and dry-ice limitations within the building
Temperature Range	-20°C to -80°C, Programmable	Passive storage – vial must be completely surrounded by dry-ice to maintain -78°C

* <https://coronavirus.nautil.us/dry-ice-coronavirus-vaccine/>

Custom Racking – Pfizer Vaccine Design

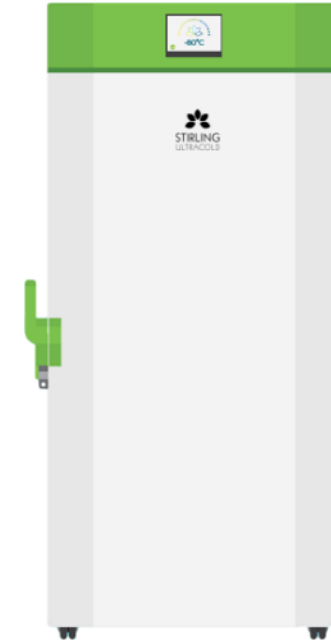
Pfizer Vaccine Storage Example



6160 doses
1232 vials
6+ boxes
2 Custom Pfizer
Racks hold vaccine



9750 doses
1950 vials
10 boxes
1 fixed shelf = 1 bundle
Custom Racking could
expand to 20 boxes



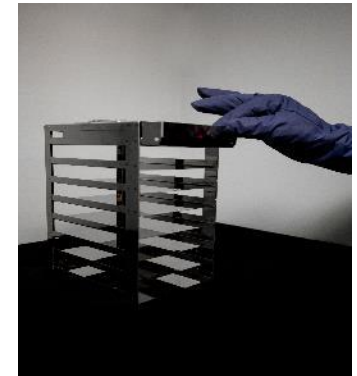
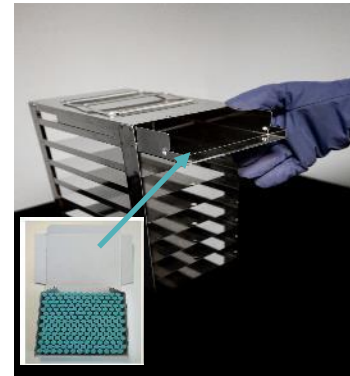
320,000 doses
64,000 vials
333 boxes
8 shelves to store vaccines
in 5 Pfizer box bundles

ULT25NEU Custom Vial Racking System

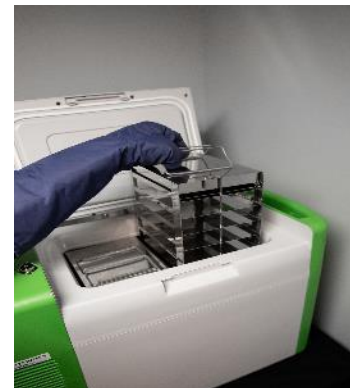
Custom racking system optimises vaccine storage in the ULT25NEU

- **Rack & Tray System**
 - 2 racks per freezer
 - 8 trays per rack
 - 77 x 2mL vials per tray

- **Pfizer 2mL Vial Storage**
 - 195 vials per box
 - 975 vials per bundle
 - 2 racks with 8 trays
 - **1,232 vials / 6,160 doses**



Steps 1 & 2: Use removable trays to scoop and transfer vials from the Pfizer box, frozen in dry ice, to the ULT25NEU Vial Racking System



Steps 3 & 4: Once both racks are full, place into the ULT25NEU for continued ULT storage without dry ice

Stirling Ultracold In The News

Stirling Ultracold In-The-News



Boston Globe, [Colder than Antarctica in winter: super cooling concerns for the possible first COVID-19 vaccine](#)

The NY Times, [How to ship a Vaccine at -80C, and Other Obstacles in the COVID Fight](#)

NBC Nightly News, [Inside The Challenges of Mass COVID Vaccination](#)

Pharmaceutical Processing World, [Stirling Ultracold prepares for COVID-19-driven need for ultra-cold transport](#)

Biopharma-Reporter, [Stirling going the extra mile to ensure cold-storage capacity for final leg in COVID-19 vaccine distribution](#)

Manufacturing Chemist, [Stirling Ultracold helps communities around the world prepare to administer COVID-19 vaccination](#)

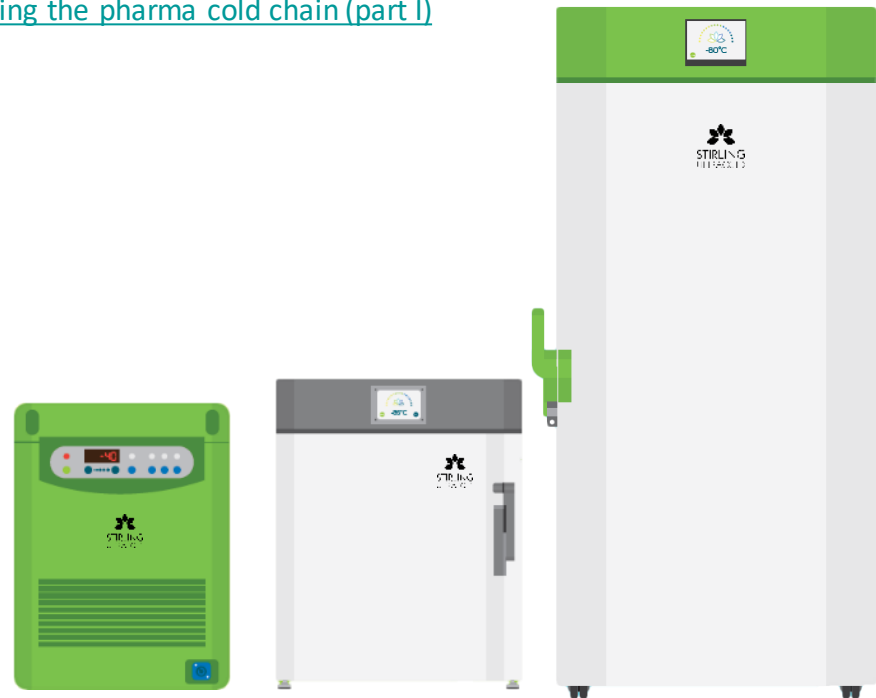
Supply Chain Quarterly, [Stirling Ultracold Helps Prep Global Communities for COVID-19 Vaccines](#)

DC Velocity, [Stirling Preps Global Communities for COVID-19 Vaccine](#)

PharmaVOICE, [Stirling Ultracold Helps Communities Around the World Prepare to Administer COVID-19 Vaccination](#)

Supply & Demand Chain Executive, [Stirling Ultracold Offers Commercially Available Freezers Capable of Storing COVID-19 Vaccines](#)

Manufacturing Chemist, [From the lab to the last mile: optimising the pharma cold chain \(part I\)](#)



Helpful Use Cases

U.S. State Department Use Case

- Initial Purchase: 250 units
- Primary Purpose: Deliver and store COVID Vaccines to U.S. Embassies across the globe
- Kitted with rolling carts and universal power supply through 12VDC plugs for constant power during transport
- Criteria for selection:
 - Ability to set temperature from -20°C to -86°
 - Can be powered by AC mains, solar, vehicle or battery
 - Universally compatible with any outlet
 - Lightweight, easy to move from site to site



VA Bay Pines Healthcare System Use Case



The Problem:

- Tampa area VA health system
- Large OP Pharmacy volume
- Dose admin over multiple clinic locations
- Plan for variable storage requirements (-20°C to -80°C)
- Need to keep doses stable close to patients and manage bulk dose storage



Stirling Solution:

- Their research showed that Stirling is the ONLY freezer on the market where the setpoint can be adjusted anywhere between -20C and -86C.
- Portability of the ULT25 was big for them with clinics and pharmacies spread across campus.

VA Bay Pines Purchased:

- (3) SU780XLE upright freezers
- (20) UTL25NEU portable freezers

