

ULTRA COLD STORAGE &
REFRIGERATED TRANSPORT SOLUTIONS
FOR VACCINE ROLLOUTS

DELIVER WITH CONFIDENCE
EVERY STEP OF THE WAY



GUARANTEEING THE SAFE STORAGE AND DISTRIBUTION OF EVERY VACCINE YOU SHIP

The scale, criticality, and urgency underpinning the global Covid-19 vaccine rollout presents a unique challenge.

Supporting dynamic rollouts and delivering confidence in the integrity of each vaccine are the primary goals. As is the ability to demonstrate how each shipment – from production to patient – is managed with precise temperature controls. A precision that needs to be maintained over the entire cold chain, from the long haul to the last mile, across land, sea, and air.

In response, Thermo King offers the connected, end-to-end active temperature-controlled transport and temporary storage solutions needed to guarantee vaccine integrity.

What's more, it's our promise to every vaccine manufacturer that they can trust our technologies to protect their products with the temperatures required for each variant — from -70°C to +30°C.

TRANSFORMING SUCCESS RATES IN VACCINE DISTRIBUTION

- 25% of all vaccines produced globally are compromised by incorrect shipping.
- WHO estimates suggest more than 50% of vaccines are wasted every year because of temperature control, logistics, and shipment-related issues.
- The biopharma industry loses approximately \$35 billion a year due to failures in temperature-controlled logistics.





MULTIPLE OPTIONS FOR MULTIPLE TEMPERATURE REQUIREMENTS

Delivering billions of time- and temperature-sensitive vaccines to the global community presents a hugely complex logistical challenge. Success will come to those with the capacity to ensure products are being handled, transported, stored, and monitored effectively – while consistently maintaining precise temperature control.

To support this endeavor, Thermo King has expanded its TK PharmaSolutions range to deliver complete coverage for every vaccine on the move and at rest, and cover temperature requirements from +30°C to -70°C. These are solutions that help guarantee the integrity of every vaccine shipped, thereby minimizing any product wastage and ensuring faster rollouts to every international community.

With Thermo King, vaccine manufacturers really can think globally and act locally, confident that product quality will never be compromised.

MAINTAINING COVID-19 VACCINE INTEGRITY FROM REFRIGERATED TO ULTRA-COLD



	Pfizer	Moderna	Johnson & Johnson	AstraZeneca
ROOM TEMPERATURE	≈6 hours	6-12 hours	12 hours	6-12 hours
REFRIGERATED 2-8°C	5 days	≤ 30 days	≤ 3 months	≤ 6 months
FROZEN -20°C	14 days	≤ 6 months	Estimated ≤ 2 years	--
ULTRA-COLD -70°C	≤ 6 months	--	--	--

COLD STORAGE SOLUTIONS: COVERING EVERY EVENTUALITY

As well as ensuring tight temperature controls for vaccines in transit, Thermo King also extends this protection to any number of storage points along the way. Our Cold Storage Solutions can maintain temperatures of -70°C for an extended period of time, thereby helping significantly reduce the degradation of any vaccines – while also helping overcome challenges relating to accessibility in less developed locations.

BOOST LOCAL CAPACITY WITH POWERFUL CAPABILITIES

— EXCEPTIONAL PERFORMANCE

Access the highest possible cooling capacity in combination with precise temperature control.

— ULTRA-LOW TEMPERATURE RANGE WITH THE TIGHTEST TEMPERATURE ACCURACY

Set precise temperatures between -70°C to -10°C to meet specific vaccine demands, with an accuracy of $\pm 1^{\circ}\text{C}$.

— LARGEST ULTRA-LOW STORAGE SOLUTION

Choose from 10 m^3 and 24 m^3 capacity, with the possibility to customize the interior for optimum ease-of-use.

— FLEXIBLE AND ADAPTABLE DESIGN

Utilize easily stackable, ISO containers ranging in in sizes 10 and 20 ft to scale capacity in line with demand.

— BUILT-IN REMOTE MONITORING

Access real-time data monitoring from each unit, that's also compliant with the Good Distribution Practice (GDP).

— READY TO GO UNITS

Cold Storage Solutions are immediately available, in stock, with impressively short delivery times.





COLD STORAGE SOLUTIONS: THE TECHNOLOGY

MAGNUM PLUS®

- Tight temperature control and total protection where you need it.
- Box temperatures between **chilled and -40 °C** in environmental conditions up to +50 °C.

GENSET

- Fully electric unit with diesel generator.
- Suitable for transit back-up.

SUPERFREEZER

- Ultra-low temperatures down to **-70 °C** to guarantee vaccine integrity.
- Only solution that can be used as both stationary and mobile vaccine distribution centers.



FROM PRODUCTION TO PATIENT

Vaccine and pharmaceutical cold chains involve many moving parts, ranging from how products are packaged and transported, to how they're stored prior to use. At Thermo King, our end-to-end transport and trailer solutions cover each step with proven temperature control technologies:



AIR SOLUTIONS (0°C TO +25°C)

— OVERVIEW

Thermo King and Envirotainer, the leading supplier of active containers, work in partnership to offer customers two units for pharmaceutical cold chains – both of which are approved by European and US aviation authorities (EASA and FAA respectively).

— PRODUCTS

Air100-RKN e1 – which fits an RKN
(1 euro pallet set)

Air200-RAP e2 – mounted on an RAP container
(4 euro pallets/5 US pallets)

— KEY FEATURES

Fully electric, 100+ hours operation,
GDP certified, multiple in-built redundancies.





OCEAN SOLUTIONS (-70°C TO +30°C)

— OVERVIEW

Thermo King supports the large volume shipments of medical and biological products by sea through standardized ISO refrigerated containers, which range in size from 440 cubic feet to 2950 cubic feet.

— PRODUCTS

MAGNUM PLUS® designed for frozen cargoes requiring set points between -40°C to +30°C, and equipped with the advanced MP4000 controller to monitor performance and temperature.

SuperFreezer – a fully electric, ultra-low temperature unit with set points between -10°C to -70°C to fit 10-40ft insulated ISO containers.

— KEY FEATURES

GDP certified solutions with the connectivity to offer 24/7 visibility and complete management from a distance.





**ROAD SOLUTIONS –
TRUCK & TRAILER
(-30°C TO +30°C)**

— **OVERVIEW**

For long-haul road transportation and urban distribution, Thermo King has GDP certified technologies for every size of trailer and truck.

— **PRODUCTS**

Advancer and SLXi series

units for trailers that offer the highest cooling and heating capacities for both single and multi-compartment applications.

Self-powered T-Series

with diesel or hybrid versions for large trucks, as well as electric standby during loading and unloading.

Vehicle-powered V-Series

designed for vehicles ranging from small vans to 7.5 ton-trucks, with tight temperature control and low noise operation.

— **KEY FEATURES**

Select options to deliver the best fuel performance, less overall servicing, and operational flexibility – while maintaining temperature accuracy of +/- 1°C.





**LAST MILE DISTRIBUTION –
VANS & SMALL TRUCKS**
(-30 °C TO +30 °C)

— **OVERVIEW**

For inner-city deliveries requiring whisper quiet and full electric transport refrigeration, Thermo King delivers market-leading innovation that's proven to keep loads in optimal condition.

— **PRODUCTS**

Vehicle-powered B/E Series

fully electric, temperature control units for vehicles up to 3.5 tons that enable 24/7 last-mile city distribution.

Cold Cube mobile refrigerated containers

portable, fully electric powered, and highly mobile freezing containers available in 5 sizes and 16 standard configurations, with full Bluetooth connectivity.

— **KEY FEATURES**

Fully electric options that comply with noise regulations (incl. PIEK standards) and urban access requirements (UVARs), while delivering outstanding temperature control.



CONFIDENCE WHEN IT MATTERS: TURNING REAL-TIME TRACEABILITY INTO REAL-TIME PROTECTION

With Thermo King Connected Solutions, vaccine manufacturers and distributors can access the real-time data they need to plan, run, and manage smarter rollouts. Utilizing GPS technology, users can track and trace a variety of factors that impact vaccine integrity – from door openings and environmental temperatures to fuel levels and the condition of individual loads – and respond fast to any emerging problem.



24/7 VISIBILITY

Constantly monitor reefer status, load condition, and asset location.



VACCINE TRACEABILITY

Demonstrate an audit trail of temperature compliance and asset security.



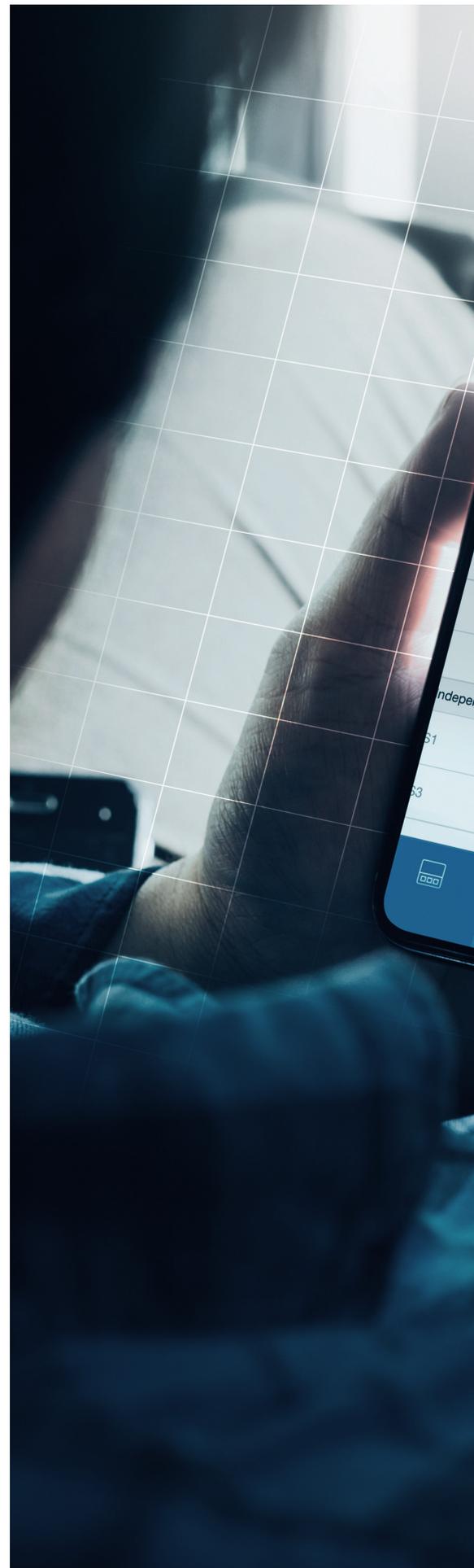
TWO-WAY INTERACTIVITY

React instantly to unexpected events and change settings from any location.



OPERATIONAL EFFICIENCY

Monitor vehicle uptime, and fuel usage to increase day-to-day fleet operations.





RELY ON TECHNOLOGY THAT'S COMPLIANT WITH GOOD DISTRIBUTION PRACTICE (GDP) — EVERY STEP OF THE WAY

All the equipment in Thermo King's PharmaSolutions range has been vigorously tested in line with GDP guidelines:

- At temperature ranges +15°C to +25°C; +2°C to +8°C; and temperatures below -20°C.
- Under extreme environmental temperatures from -30°C to +40°C to assure you of your cargo's safety in extremes of climate.
- Test of door openings, failure mode as a reference for customer's risk management analysis.

EXPERT SUPPORT THAT'S ALWAYS READY AND WAITING

Supporting our vaccine distribution technologies is an award-winning international dealer network, that customers can always rely on for immediate, experienced, and specialist support.



GLOBAL COVERAGE
including 500+ service points
in 75 countries



NON-STOP AVAILABILITY
with 24/7/365
direct telephone access



RELIABLE SUPPORT
most locations can be
reached within 2 hours

ADVANCED SERVICE OFFERINGS: DELIVER WITH CONFIDENCE

PharmaAssist

This service package helps wrap the benefits of preventative maintenance around refrigerated transport fleets. Inspections and services are adjusted to meet GDP guidelines, with prioritized treatment and breakdown coverage included.



Thermo King – by Trane Technologies (NYSE: TT), a global climate innovator – is a worldwide leader in sustainable transport temperature control solutions. Thermo King has been providing transport temperature control solutions for a variety of applications, including trailers, truck bodies, buses, air, shipboard containers and railway cars since 1938.

For further information
europe.thermoking.com
tkpharmasolutions.com

Find your nearest dealer on
dealers.thermoking.com

