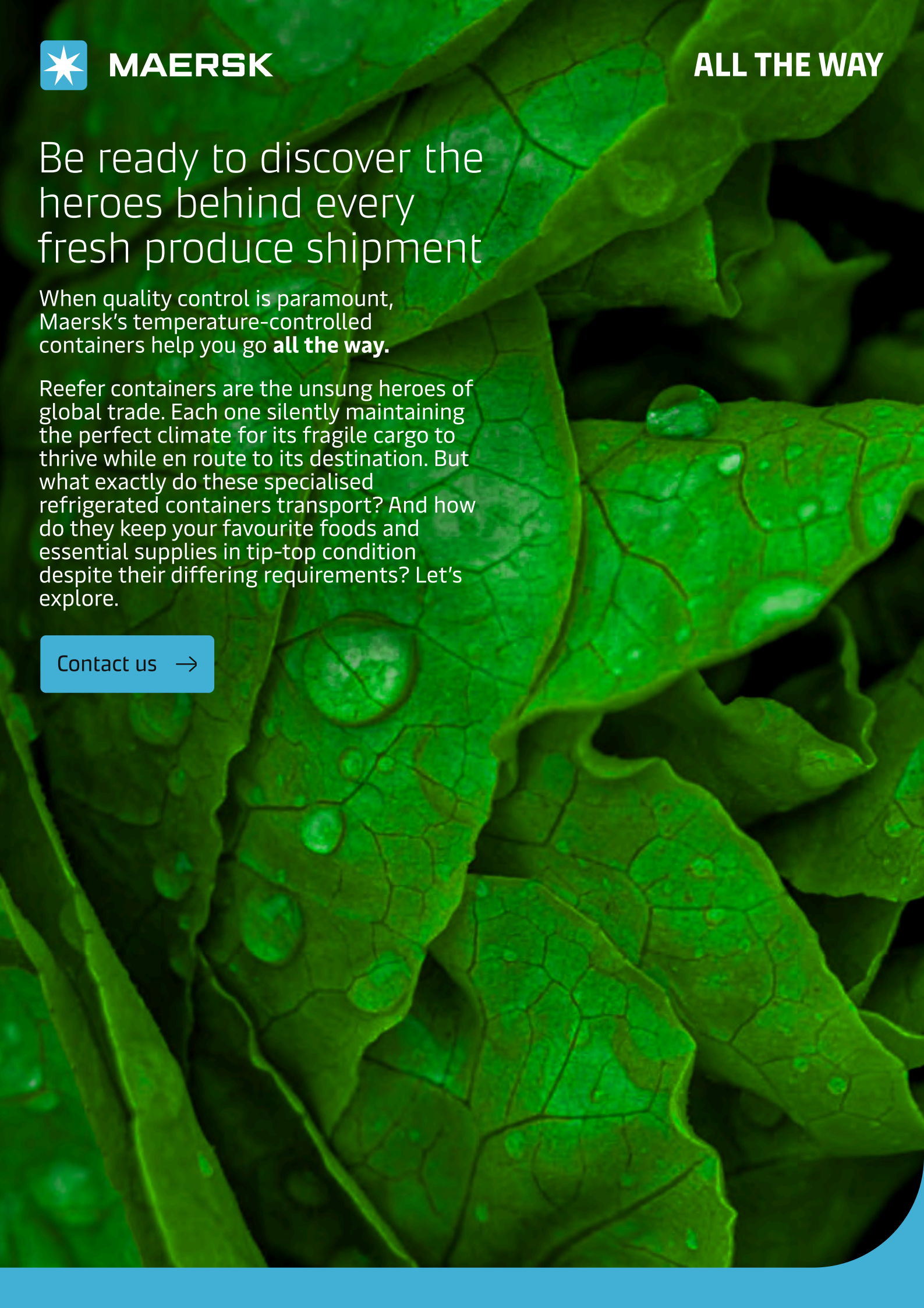
MAERSK
ALL THE WAY
Be ready to discover the heroes behind every fresh produce shipment
When quality control is paramount, Maersk's temperature-controlled containers help you go **all the way.**
Reefer containers are the unsung heroes of global trade. Each one silently maintaining the perfect climate for its fragile cargo to thrive while en route to its destination. But what exactly do these specialised refrigerated containers transport? And how do they keep your favourite foods and essential supplies in tip-top condition despite their differing requirements? Let's explore.
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What types of goods are transported in reefer containers?

Reefer containers (also known as reefers) are designed to maintain precise temperature and humidity levels. By creating the ideal microclimate for the cargo in their charge, they preserve its quality and safety. In doing so, they also enable compliance with strict regulations and standards, such as those outlined by the International Organization for Standardization (ISO).

Here is a breakdown of the most common types of cargo shipped in refrigerated containers.

Fresh produce
Fresh produce means fruits and vegetables that have not been processed. With their adjustable temperature and humidity controls, reefer containers mimic ideal storage conditions for each type, slowing down the ripening process and ensuring freshness.

Meat and seafood
Safeguarding food quality is paramount, especially for this category. Reefer containers maintain consistently low temperatures, preventing bacterial growth and ensuring these products reach their destination safely. Since fresh meat and seafood spoil quickly, it is important to prevent thawing or refreezing during transport.

As with fresh produce, different meat and seafood products require different temperature settings while in transit.

Dairy products
Milk, cheese, and other dairy products rely on precise chilled environments to prevent spoilage and maintain quality. Cold chain logistics ensures these items arrive at their destination in the best possible condition.

Pharmaceuticals
Life-saving medications, particularly biological therapeutics such as vaccines, require strict temperature control throughout transportation. Refrigerated containers guarantee the efficacy and safety of these vital supplies.

1. **Medications:** Many medications, especially biologics (e.g., insulin, chemotherapy drugs), require specific temperature ranges (typically 2-8°C) and humidity levels (40-60%).

2. **Vaccines:** Temperature-sensitive vaccines require precise temperature control within a narrow range (often 2-8°C) to maintain potency and efficacy.

3. **Cryogenics:** Some pharmaceuticals and biological material (such as stem cells and organs) require specialised cryogenic containers and sophisticated temperature control systems for transportation.

   They are extremely sensitive to temperature fluctuations, and it's crucial to maintain ultra-low temperatures below -150°C. Even minor variations render products unusable.

Other temperature-sensitive cargo
The world of cold chain logistics using reefer containers extends beyond the kinds of cargo you might expect. Here are some other items that rely on cold chain logistics.

1. **Fresh cut flowers:** Maintaining ideal temperatures (typically between -1 and +4°C) and humidity levels is crucial for keeping flowers fresh and vibrant.

2. **Electronics:** Sensitive electronic components can be susceptible to damage from extreme temperatures. Reefer containers create a stable environment, safeguarding delicate parts during transport.

3. **Art and antiques:** Priceless works of art and historical artefacts are sensitive to heat and humidity. Reefer containers provide the necessary climate control to protect these treasures during transport.

Yet other examples of products requiring temperature control include chocolate, bonsai trees, potted plants, animal hides, and certain chemicals. These general guidelines outline the optimum conditions for the transport and storage of 100s of commodities. It is worth noting, however, that actual requirements may vary based on the specific product, its origin, maturity, and intended destination.

Did you know? The earliest recorded delivery of refrigerated cargo dates back to 1878, when 80 tons of mutton arrived in perfect condition at the port of Le Havre, France.

Beyond temperature-controlled cargo: How else do reefer containers protect goods?

Temperature is not the only important climate factor that must be well-regulated during transportation. Depending on the cargo, refrigerated containers also need to enable precise control of humidity and/or fresh air exchange levels. Fresh-cut flowers, for example, require good air circulation to allow them to breathe and prevent stagnant, moist air from causing spoilage.

What is the difference between ambient, chilled, frozen, and deep-freeze foods?

Understanding the specific needs of these different cold chain freight categories is important for proper food storage, safety, and quality. Here's a breakdown:
(Refer to Refrigerated Cargo: Types, Temperatures and Technologies | Maersk)

Temperature categories for reefer cargo

Factor	Ambient	Chilled	Frozen	Deep-freeze
Definition	Foods that can be stored at room temperature without refrigeration	Foods that require refrigeration to maintain freshness and safety	Foods preserved by rapid freezing at very low temperatures	Foods stored at extremely low temperatures for long-term preservation
Temperature range	15-25°C	1-7°C	Below -18°C	Below -29°C
Perishability	Low	High	Moderate	Low
Bacterial growth	Minimal	Moderate	Significantly reduced	Negligible
Nutrient retention	Generally high	Can decline over time	Generally well-preserved	Generally well-preserved
Texture and flavour	Can vary depending on processing	Can deteriorate quickly	Can be affected by freezing/thawing	Excellent preservation
Storage conditions	Cool, dry, and dark	Refrigerate immediately	Keep frozen continuously	Maintain consistently frozen temperatures
Examples	Canned goods (1-5 years), dried fruits (6-12 months), pasta (1-2 years), rice (1-2 years), cereals (3-6 months), shelf-stable milk (3-6 months)	Dairy products (1-2 weeks), meat (3-5 days), poultry (1-2 days), seafood (1-2 days), eggs (3-5 weeks), deli meats (3-5 days)	Frozen vegetables (6-12 months), fruits (6-12 months), meat (6-12 months), seafood (3-6 months), prepared meals (2-6 months), ice cream (3-6 months)	High-value foods (e.g., rare meats, seafood) (1-3 years)
Considerations for reefer transportation	While it does not require active refrigeration, maintaining stable temperatures within this range is important. Extreme temperature fluctuations can damage items.	It is crucial to maintain a consistent temperature within this narrow range. Any temperature fluctuations can accelerate spoilage, promote bacterial growth, and shorten shelf life.	Precise temperatures are essential to maintain a frozen or deep-freeze state throughout the journey. Any fluctuations can lead to thawing, compromising quality and safety.	It requires highly specialised equipment and extremely low temperatures to ensure near-zero degeneration of some ultra-high-value commodities.

Reefer container technology: How innovation is driving advancements

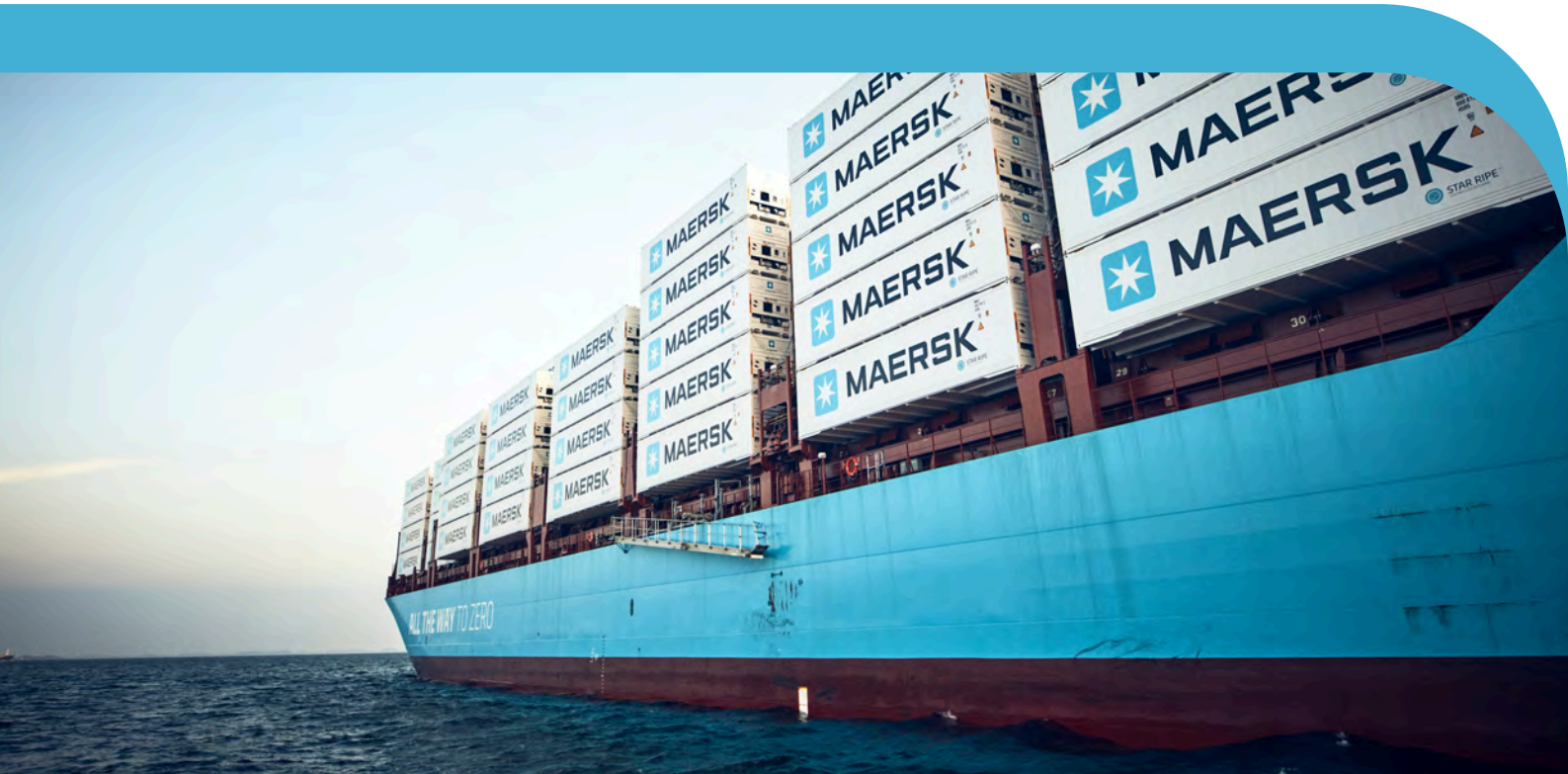
To optimise the shelf life, quality and safety of temperature-sensitive goods, refrigerated containers employ several key technologies. This is where leading logistics services providers set themselves apart – by developing highly accurate, efficient, and cost-saving systems that outperform other suppliers in safeguarding the quality of their clients' temperature-sensitive cargo.

1. **Precise temperature control:** Powerful refrigeration units maintain precise temperature control within the container, ensuring that products are kept within their optimal temperature ranges. Integrated sensors continuously monitor internal temperatures, providing real-time data to operators.

2. **Humidity control:** Dehumidification systems help regulate humidity levels, preventing condensation and ensuring optimal conditions for various products.

3. **Controlled Atmosphere (CA) systems:** For certain produce (e.g., apples, grapes), CA systems adjust the levels of oxygen and carbon dioxide within the container, slowing down ripening and extending shelf life. Controlled air circulation helps maintain even temperature distribution and prevent localised temperature variations within the container.

4. **Remote Container Management (RCM):** GPS tracking enables real-time monitoring of the container's location and allows for proactive intervention in case of unforeseen delays or disruptions. With data logging, one can record temperature and humidity data of the transit, providing a detailed history of the conditions within the container.



Companies like Maersk are constantly developing new technologies for reefer containers, such as more efficient refrigeration units, improved temperature control systems, and enhanced data analytics capabilities. Advancements in cold chain logistics like supply chain visibility and automation are revolutionising cold chain logistics, reducing food loss, and enhancing efficiency.

Other innovations focus on delivering superior climate conditions for specific product categories. Examples include:

- Combining CA technology with Controlled Ripening (CR) capabilities to enable banana ripening during transit.
- Deploying advanced insulation and refrigeration technology to keep high-value seafood products (such as tuna, shellfish, swordfish, and urchins) at ultra-low temperatures (-60 to -20°C).

Whether it's pineapples from Costa Rica or fish from Spain, Maersk enables you to ship a wide range of temperature-controlled cargo worldwide. With our cold chain logistics solutions and end-to-end integration capabilities, we can help you maintain the quality and freshness of your cargo, while providing full traceability and visibility across the supply chain.

Explore Maresk's reefer container technology for solutions that suit the unique needs of your temperature-sensitive cargo.

Contact us →