

Reefer Container 101 - The Mobile Freezer That Keeps Perishables Perfect on the MoveHow It Works



- Compressor → condenser → evaporator cycle cools the air.
- Variable-speed fan distributes air evenly through the floor T-rails.
- Return-air sensor tells the controller to adjust capacity, keeping ± 0.3 °C.
- Data logger records temperature every minute; alarms sent by 4G/5G if deviation > 1 °C.

1. Typical Use Scenarios

- Seafood - tuna sashimi blast-frozen at -55 °C prevents histamine build-up.
- Ice-cream - constant -25 °C avoids ice-crystal growth.
- Fresh fruit - 0 °C to $+4$ °C plus controlled atmosphere (lower O_2 , higher CO_2) slows ripening.

- Dairy - yoghurt at +4 °C with high humidity keeps texture.
- Pharmaceuticals - vaccines at 2-8 °C or frozen -20 °C; dual-set alarms comply with GDP.
- Chemicals - isocyanates or adhesives stored at -30 °C to stop polymerisation.
- Flowers - roses at +2 °C, 95 % RH, ethylene filter extends vase life.

2. Container Types & Options

- 20'RF - 28 m³, good for heavy frozen fish; fits standard truck chassis.
- 40'HC RF - 67 m³, most common, ultra-low -60 °C kit available.
- 40'HC RF CA - Controlled-atmosphere version adds N₂/CO₂ membrane.
- Hard-top reefer - removable steel roof for top-loading of hanging meat.
- Dual temp - partition wall creates two climate zones.

3. Operational Highlights

- Pre-cool cargo, not container; avoid hot stuffing.
- Continuous power on vessel genset or shore power; clip-on diesel genset for rail/road legs.
- PTI (pre-trip inspection) checks compressor, refrigerant level, door seals and temperature accuracy within 4 hours.
- Auto-defrost cycle every 6 h removes ice from evaporator, ensuring stable performance in humid climates.

4. Sustainability & Compliance

- New R-452A refrigerant cuts GWP by 45 % vs legacy R-404A.
- Variable-speed drive compressor saves 22 % energy.
- 70 % recycled steel frame, 100 % recyclable insulation foam; meets EU WEEE & RoHS.

5. Economic Benefits

- Reduce spoilage to < 0.5 % versus 5-10 % in break-bulk reefer ships.
- Insurance premium rebate up to 15 % when live-tracking data is shared.
- Faster customs clearance—temperature log proves cold-chain integrity.