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INDUSTRY OPINION PAPER

A PHARMAAERO PROJECT | JUNE 2026.

Dual Temperature Acceptance (DTA):

Aligning Air Cargo Standards with Pharmaceutical Reality

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I. Executive Summary

Pharmaceutical air cargo increasingly relies on passive packaging systems qualified for Controlled Room Temperature (IATA CRT, 15–25°C) transport, even when products require Cold (IATA COL, 2–8°C) storage at destination. This dual-temperature operating model has become common practice for vaccines and other temperature-sensitive healthcare products. The operational challenge is not the airfreight segment itself—long-haul flights typically remain well within the thermal autonomy of passive packaging—but the extended dwell times that can occur at destination due to customs clearance, ground handling, last-mile trucking or other local processes. In these situations, a planned CRT-to-COL transition at the destination airport becomes essential to maintain product integrity and ensure compliance with Good Distribution Practice (GDP).

Despite its widespread operational use, the regulatory framework governing air cargo has not kept pace with this reality. IATA[1] TACT Rule 2.3[2] permits only one temperature instruction per Air Waybill, preventing shippers from documenting both the transport temperature and the destination storage temperature on one document of record. As a result, the industry has been forced to rely on informal, non-standardised workarounds, including email instructions, supplementary labels, manual reminders, local Standard Operating Procedures (SOPs) and bilateral agreements between shippers, freight forwarders, airlines and ground handlers. These practices are operationally unreliable, GDP non-compliant, legally ambiguous and impossible to scale across global networks.

This misalignment between current industry practices and the existing regulatory framework contributes to variability in operational execution and creates challenges for the consistent use of passive packaging solutions. It may also limit broader and more equitable access to dual-temperature handling, as today the process often depends on established bilateral relationships rather than a uniform, standardised mechanism available to all stakeholders.

Supported by pharmaceutical manufacturers and Logistic Service Providers (LSPs), this Industry Opinion Paper sets out the case for investigating and suggesting Dual Temperature Acceptance within the IATA ecosystem. Its purpose is to inform structured engagement with IATA and contribute to the future evolution of Air Waybill (AWB) standards, so it reflects the realities of current pharmaceutical transport.

A detailed technical report with in-depth analysis is available exclusively to Pharma.Aero members.

[1] International Air Transport Association
[2] The Air Cargo Tariff. The IATA publication containing operational rules for international air cargo. TACT Rule 2.3 governs acceptance of time and temperature sensitive shipments.

II. Scope & Methodology

The project combined regulatory assessment, operational analysis, stakeholder consultation, industry interviews, survey-based evidence collection, and practical process design across the pharmaceutical air cargo supply chain.

The work focused specifically on planned dual temperature shipments in which the shipment is transported under a defined transport temperature range, typically Controlled Room Temperature (IATA CRT, 15–25°C) or Extended Room Temperature (IATA ERT 2–25°C), while requiring transition to Cold (IATA COL, 2–8°C) storage at destination once the packaging thermal validity window expires.
at destination once the packaging thermal validity window expires.

The assessment covered pharmaceutical manufacturers, freight forwarders, airlines, ground handling agents, packaging providers, and regulatory and industry frameworks including IATA TACT, Temperature Control Regulations (TCR), CEIV Pharma[3], GDP, and MC99[4] liability structures.

Work Package 01. Established the operational and compliance baseline through surveys, stakeholder interviews, operational reviews, and legal analysis.

Work Package 02. Translated these findings into a proposed dual temperature operational and governance framework, including responsibility allocation, transition trigger logic, and handling requirements.

Work Package 03. Focused on validating the market need and translating the operational model into a practical AWB, Special Handling Code (SHC), and documentation solution suitable for implementation within existing IATA structures.

Survey and Stakeholder Participation

The project included participation from pharmaceutical manufacturers, freight forwarders, airlines, ground handling agents and packaging providers, exclusively part of Pharma.Aero membership. The consultation process comprised:

56 survey respondents
(9 airlines, 16 freight forwarders, 7 GHAs, 12 packaging providers, 12 pharmaceutical companies)

8 stakeholder interviews
(2 pharmaceutical shippers and 2 airlines)

Representation from Europe, North America, Asia-Pacific and the Middle East

The project scope excludes unplanned emergency temperature transitions triggered during transit disruption events. These scenarios remain outside the formal DTA framework and require separate contingency management procedures.

[3] Centre of Excellence for Independent Validators in Pharmaceutical Logistics
[4] Montreal Convention 1999. International treaty governing airline liability for air cargo. Caps carrier liability at 26 SDR/kg unless a higher Declared Value for Carriage is declared.

III. The Industry Challenge

01. A Real, Widespread Operational Scenario

Across airlines, freight forwarders (FFWs), ground handlers (GHAs), packaging providers, and pharmaceutical shippers, there is a common consensus: Dual-temperature shipments are real, frequent, and currently unmanaged by any formal standard.

Surveys and interviews evidence confirms:

- All five stakeholder groups recognise the scenario
- GHAs are operationally capable but lack standardised instructions
- 100% of airline respondents cited AWB instruction confusion as the primary operational barrier.
- **43%** of airlines reported they currently manage dual temperature shipments, informally
- **67%** of airlines stated "they would prefer dual temperature acceptance to be formally recognised and regulated by IATA"
- Forwarders cite AWB preparation and documentation as one of the most difficult stages.
- Packaging providers report unclear communication between product and transport temperature.
- GDP documentation gaps are highlighted as a systemic compliance issue.

Findings per category of stakeholders:

Pharmaceutical manufacturers

- Packaging qualification concerns
- Destination transition requirements
- Logger and excursion assessment practices

Ground Handling Agents

- Operational execution requirements
- Handling-stage risks
- Label and SHC preferences
- Training needs

Airlines

- Operational capability
- Informal handling practice
- Station capability limitations
- Disruption management observations
- Implementation requirements

Packaging Providers

- Packaging validity and qualification considerations
- Route qualification concerns
- Transition trigger dependency
- Communication expectations

Freight Forwarders

- Documentation handling challenges
- Pre-alert management
- Destination coordination issues
- Responsibility concerns
- Implementation readiness

02. The Single-Temperature Rule as the Root Cause

A range of operational workarounds has emerged across the supply chain because the current Air Waybill format does not allow dual-temperature instructions to be formally recorded. These practices, developed independently by different stakeholders, reflect the industry's need to manage CRT-to-COL transitions despite existing documentation constraints.

An anonymised dataset comprises 15 shipments across 13 international trade lanes involving temperature-sensitive pharmaceutical products. Although the sample size is limited and not statistically representative of the broader industry, it provides a clear operational illustration of how destination handling practices directly influence temperature outcomes.

- **Scope of shipments:** 15 shipments across 13 distinct trade lanes
- **Geographic distribution:** Origins were predominantly in the United States (14 of 15 shipments), with one Belgium–Egypt lane. Destinations included Vietnam, Taiwan, China, India, Panama, Japan, Thailand, Argentina, Spain and Egypt, spanning Asia Pacific, Latin America, Europe and the Middle East/Africa.
- **Product category:** All shipments involved vaccines.
- **Representativeness**: These 15 shipments represent a subset of available data.

The determining factor was not packaging type, route complexity, or carrier performance. The single differentiator was whether the destination Ground Handling Agent (GHA) received and acted upon a clear, unambiguous instruction for the CRT-to-COL transition. When the instruction was provided and executed, temperature control was maintained. When it was absent or unclear, excursions occurred.

03. Industry Responses to the Dual-Temperature Challenge

While several pathways exist to address this industry challenge, they differ markedly in scalability, regulatory robustness, and long-term suitability for global pharmaceutical logistics.

Some carriers may adopt different approaches including implementation of internal operations process and centralised oversight models to manage complex temperature-controlled shipments on a case-by-case basis. These practices allow carriers to operate within existing documentation frameworks, avoiding immediate changes to items such as the air waybill or handling labels, which are often challenging to adopt and often applied inconsistently across locations and stakeholders. One recent example is Qatar Airways' launch of a carrier-specific solution designed to support this type of model that allows for enhanced operational control and flexibility, relying on strengthened coordination processes rather than formal regulatory or structural changes.

Other innovative concepts have emerged, including the potential development of a digital handling label, enabling ground handlers to scan a shipment and instantly receive the correct handling instruction set. While promising, such solutions require significant digital infrastructure alignment and cross-stakeholder adoption before they can function reliably at scale over the entire multi-fragmented value chain.

IV. The DTA Framework

The primary scope of this project is to investigate and analyse the introduction of a dedicated DTA label to replace the current TTT label for dual-temperature shipments. This would provide a clear, standardised, and universally recognisable visual cue that aligns with existing IATA labelling conventions while enabling the explicit communication of both transport and destination storage temperatures.

Across all stakeholder groups, the feedback is consistent: regardless of which operational model individual organisations choose to adopt, the industry must converge around common standards and recommended practices, stakeholder independent. Only through harmonised processes can handling be made lean, predictable, and efficient. Even if not mandated as a formal global standard, a shared framework would create the necessary alignment, reduce variability, and strengthen the overall integrity of pharmaceutical air cargo operations.

The proposed Dual Temperature Acceptance (DTA) framework is intended to transform a currently informal process into a more standardised and globally recognisable handling model. It is presented as a practical concept for discussion rather than a finalised solution.
The DTA framework is designed to provide a clear, predictable and compliant method for managing planned transitions from CRT (15–25°C) transport conditions to COL (2–8°C) storage conditions at destination. Its strength lies in its simplicity: the shipper formally declares the planned transition on the Air Waybill, and the destination Ground Handling Agent executes the transition automatically at the Received and Checked import Freight (RCF) milestone, without the need for conditional decision-making or real-time assessment. As a proposed model, it is intended to serve as a basis for further industry dialogue, refinement and alignment.

01. Scope of the Framework

The DTA framework applies exclusively to planned CRT-to-COL transitions for passive packaging solutions whose thermal validity is expected to expire before final delivery. These are deliberate, pre-defined transitions communicated before uplift.

Unplanned transitions, such as those triggered by delays, diversions or irregular operations, remain outside the scope of DTA and continue to be managed under existing airline contingency processes.

02. The DTA Special Handling Code

To ensure system-level recognition, the framework introduces a new Special Handling Code: DTA. This code becomes the single operative identifier for dual-temperature shipments. It replaces the need to combine CRT and COL codes on the same AWB, removes ambiguity, and ensures that all handling systems and operational teams recognise the shipment as requiring a planned temperature transition.

The DTA code drives three outcomes: CRT handling during transport, visibility of the planned transition, and automatic COL storage at destination.

03. The DTA Label

The working group recognises that the current IATA Time and Temperature Sensitive (TTT) Label is not fully adapted to shipments requiring a planned CRT-to-COL transition. While there is broad agreement that the labelling approach should evolve, there is no single preferred design or format across stakeholders. Instead, the collective view is that a revised label should incorporate a set of essential informational elements, while leaving room for industry bodies to determine the final level of complexity or simplicity.

At a minimum, stakeholders agree that any future label should clearly communicate the dual-temperature nature of the shipment, including the transport temperature, the destination storage temperature, and a reference to the planned transition. Many also emphasise the importance of maintaining a recognisable IATA visual identity to support global operational consistency. Additional elements frequently mentioned include a distinct identifier for dual-temperature shipments, improved visibility for ground handlers, and a layout that reduces reliance on free-text instructions or manual interpretation.

04. Standardised Handling Instructions

The operational model requires four standardised instructions:

- **Pre-departure notification:** Before the shipment departs from origin, the freight forwarder issues a prealert to the airline, referencing the DTA AWB instruction and requesting confirmation that COL storage capacity will be available at destination. The airline, in turn, is responsible for coordinating with the destination Ground Handling Agent to confirm availability. This approach ensures that the necessary information is relayed through the appropriate operational channels and that the destination GHA is prepared before the shipment takes off, removing the need for realtime coordination upon arrival.
- **Acceptance:** The shipment is accepted at origin under CRT conditions, with verification of the DTA label and the AWB DTA instruction.
- **Transit:** CRT handling is maintained throughout the journey at all stations, with no temperature transition before arrival at the final destination.
- **Destination:** At the RCF milestone, the destination GHA transfers the shipment directly into COL (2-8 degrees C) storage, per the AWB DTA instruction and the airline handling instruction, without conditional checks or additional authorisation. The transition time is recorded and the consignee is notified.

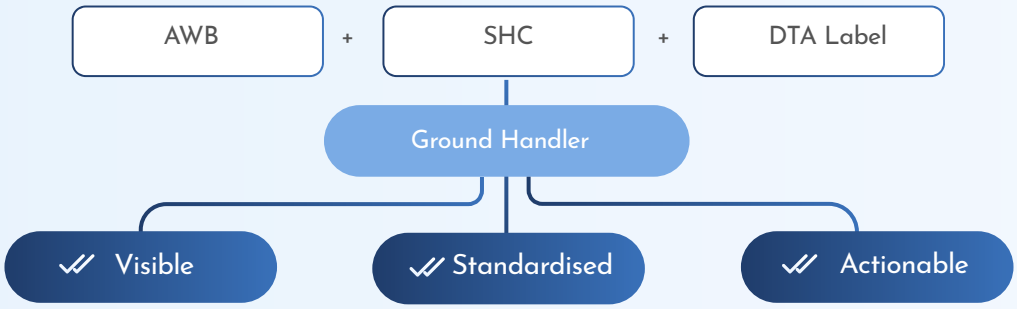
This simplicity is intentional. It removes variability, reduces operational risk, and ensures that the transition is executed consistently across all stations.

05. Why the Industry Needs DTA

Operational Reliability

Ground handlers report that free-text instructions may be overlooked, supplementary labels are not always applied consistently, and house AWB instructions do not reliably transfer to the master AWB. These variations highlight the need for greater harmonisation in how dual-temperature instructions are communicated and executed across the supply chain.

By combining a formal SHC, a structured AWB instruction and a dedicated DTA label, the proposed framework supports a more uniform, standardised and easily recognisable process. This reduces ambiguity and helps ensure that the transition is communicated clearly and actioned consistently at destination.



GDP Compliance

EU GDP Chapter 9 (sections 9.1 and 9.3)[5] requires full documentation of temperature conditions throughout transport. Under the current single-temperature AWB rule, it is impossible to document both the transport temperature and the destination storage temperature for dual-temperature shipments.

The DTA framework resolves this by enabling:

- documented CRT transport conditions,
- documented COL storage requirements, and
- a documented transition instruction.

This alignment strengthens compliance and reduces audit exposure for all parties.

Liability Clarity

In the absence of a formal AWB instruction, liability across the supply chain becomes uneven and difficult to manage. Shippers often bear the majority of the financial exposure associated with temperature-sensitive products, while airlines remain protected under the established liability framework of MC99. Ground handling agents, meanwhile, cannot reasonably be held responsible for executing a temperature transition they were never formally instructed to perform.

The introduction of DTA creates a clearer and more enforceable chain of responsibility. By defining the instruction on the AWB and ensuring it is visible to all parties, the framework reduces ambiguity, strengthens contractual clarity, and supports a more balanced allocation of operational and legal accountability across the logistics chain.

[5] 9.1: the obligation to demonstrate temperature conditions were maintained
9.3: the obligation for labels to show temperature conditions and special handling requirements

Packaging Optimisation and Sustainability

The benefits of DTA extend beyond compliance and risk reduction. By providing confidence that destination storage requirements can be formally communicated and consistently executed, DTA may enable broader use of passive packaging solutions optimised for transport rather than end-to-end storage duration.

This creates opportunities to:

- Reduce packaging size and weight
- Reduce waste generation
- Improve payload efficiency
- Support sustainability objectives through lower transport-related emissions
- Lower packaging costs

While packaging design decisions remain product-specific, a standardised dual-temperature framework could remove one of the key operational barriers that currently limits optimisation opportunities.

Market Access Equity

Access to dual-temperature handling today often depends on established bilateral arrangements, which means availability can vary across shippers and trade lanes. Smaller shippers or those operating in less developed corridors may therefore experience differing levels of access to these services.

A DTA framework would introduce a universal, standardised mechanism available to all market participants, supporting more consistent handling practices and enabling broader, more equitable adoption across the industry.

The DTA framework delivers value across the entire pharmaceutical logistics ecosystem.

- **For patients and regulators:** stronger GDP compliance, fewer excursions, improved product integrity.
- **For shippers:** enforceable instructions, reduced liability exposure, potential optimisation of packaging strategies.
- **For airlines and GHAs:** clearer procedures, reduced operational risk, opportunity to offer a differentiated service.
- **For the industry:** a unified, scalable global standard aligned with CEIV Pharma, improving trust & transparency.

V. Regulatory Action & Industry Readiness

For the DTA framework to function as a recognised, reliable and globally scalable solution, the project underscores the importance of continued collaboration and further dialogue with IATA to explore potential regulatory updates. These updates are not about creating new infrastructure or imposing complex operational changes; rather, they involve formally acknowledging the dual-temperature scenario and assessing how existing documents, codes and processes might evolve to support it. The precise form of any changes would be determined through IATA's established governance processes, but the direction is clear: the current rules do not accommodate planned CRT-to-COL transitions, and some degree of regulatory adaptation may be required to close this gap.

What is equally clear is that the industry is ready for such a step. Airlines, ground handling agents, freight forwarders and shippers, from Pharma.Aero membership, all demonstrate strong alignment on the need for a formal and uniform mechanism, standardised for the entire air cargo industry. Airlines already manage dual-temperature shipments informally and have expressed support for an IATA-recognised approach. GHAs report that they can carry out the transition effectively when given clear, standardised instruction. Freight forwarders welcome a clearer AWB-based instruction, recognising that documentation is currently a major risk point. Shippers confirm the operational need, with many relying on manual workarounds and others lacking access entirely.

The message is consistent: the operational capability exists, the demand is real, and the sector is prepared. What is now required is a coordinated regulatory response from regulators to enable the industry to move from informal workarounds to a formal, standardised and equitable framework.

Future Digital Evolution

The proposed DTA framework is intentionally designed as a practical and implementable solution that can be integrated within existing air cargo processes. However, the working group recognises that future industry evolution may include digital enablement through e-AWB enhancements, Cargo iQ milestone integration, visibility platforms, and digital handling instruction solutions.

As industry digitalisation progresses, DTA-related information could potentially be exchanged electronically and linked directly to shipment visibility systems, reducing reliance on physical documentation and further strengthening operational consistency.

The current proposal should therefore be viewed as a foundational step that addresses an immediate operational need while remaining compatible with future digital transformation initiatives.

VI. Conclusion

Dual-temperature handling is not a theoretical future requirement; it is an established operational reality across global pharmaceutical air cargo. Shipments routinely require a planned transition from CRT transport conditions to COL storage at destination, yet the current AWB framework does not recognise or support this scenario.

This misalignment and the absence of clear standards, forces the industry to depend on informal workarounds that vary by lane, carrier and station, creating unnecessary risk and inconsistency.

To address this gap, the sector requires standardisation, both in how dual-temperature instructions are documented and in how they are communicated across the logistics chain. The proposed DTA framework offers one practical, compliant and operationally simple pathway to achieve this. It provides a structured mechanism for declaring the planned transition, ensuring that all parties receive clear, actionable instruction.

However, meaningful progress depends on formal industry endorsement and active engagement with IATA. Regulatory adaptation is essential to ensure that AWB standards, handling codes and operational processes evolve in line with contemporary pharmaceutical logistics. By aligning regulatory frameworks with operational reality, the industry can strengthen GDP compliance, reduce liability ambiguity, improve handling reliability and enable equitable access to high-quality temperature-controlled transport.

The path forward is clear:

the challenge exists, the need is recognised, and the industry is ready. What is required now is coordinated action to bring Dual Temperature Acceptance into the formal structure of global air cargo standards.

VII. Acknowledgements

The Dual Temperature Acceptance Project was initiated by Zoetis, a strategic member of Pharma.Aero and the project main lead. The project was developed, coordinated, and managed by Pharma.Aero, bringing together a diverse group of industry stakeholders representing pharmaceutical manufacturers, logistics service providers, air cargo carriers, ground handling organisations, and supply chain experts.

The project group included active participation from Etihad Cargo, JAS Worldwide, Lainpharma, MSC Air Cargo, and Swissport. Through their collective expertise, operational experience, and commitment to innovation, these organisations contributed valuable insights that helped shape the project's findings, recommendations, and industry perspectives.

This initiative demonstrates the value of cross-industry collaboration in addressing complex supply chain challenges and advancing best practices for the transportation of temperature-sensitive healthcare products. The project team extends its sincere appreciation to all participating companies and subject matter experts for their engagement, constructive review, and significant contributions throughout the project.

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