PHARMA AERO

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WHITE PAPER

AIRSIDE TRANSPORTATION SURVEY

JANUARY 2020

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1. Introduction

Pharma.Aero aims at achieving excellence in reliable end-to-end air transportation for pharma shippers, by fostering collaboration between CEIV certified airport communities dedicated in developing and pioneering when it comes to handling, storage and air transportation of pharmaceuticals. Pharma.Aero's goals are to create higher transparency and to improve performance of the airfreight supply chain.

To this end, Pharma.Aero placed great importance in implementing projects that address the needs of the shippers and add value for its members. It is only logical that one of Pharma.Aero's first few projects is to address the weakest link in the air pharma supply chain i.e. airport on-tarmac pharma transportation. Airport on-tarmac transportation presents the greatest temperature excursion risks, which can jeopardize the efficacy or usefulness of the pharmaceuticals.

The project sets out to gather data and insights through a survey process, in which various Pharma.Aero members across the pharmaceutical supply chain were invited to participate. These include airport operators, airlines, ground handling companies, freight forwarders and shippers. The insights from the survey were analysed through a series of Project Group meetings.

This report identifies and lists down common operational processes, measures and technical solutions that reduce the time taken and mitigate temperature excursion on airport tarmac when transporting time and temperature sensitive pharmaceutical cargo.

2. Project charter

Pharma.Aero has launched the **Airside Transportation Survey (ATS)** project as a response to pharma shippers' feedback that most temperature deviations happen during airside transit on airport tarmac. Airports aspiring to become a preferred pharma gateway should implement solutions in collaboration with their local partners and service providers to reduce such risks.

If the temperature control during airside transport is not managed well, it will remain a weak link in the airport's handling and transport flow and as such will reduce the quality of the pharma services for the entire airport community.

2.1 Project scope

The project aims to identify and list down common operational processes, measures and technical solutions that reduce the transport time in uncontrolled ambient conditions and mitigate temperature excursion on airport tarmac.

2.2 Project purpose

Various solutions and standard operating procedures (SOPs) currently exist to reduce or avoid the exposure of pharma shipments to extreme temperatures on airport tarmac. Pharma.Aero members were invited to share their existing processes, measures and technological solutions on the subject and identify common practices.

2.3 Project leads

Miami International Airport and Mumbai International Airport were the Project Leads. An external consultant, Céline Crahay from 3CeL, was subsequently appointed as project manager. The authors of the technical report are Céline Crahay and Frank Van Gelder, with the support of Jaisey Yip from Changi Airport Group and Nathan De Valck from Brussels Airport.

2.4 Project participants

Organisation	Supply Chain Role	Main Representative
Brussels Airlines Cargo	Airline	Reinout Puissant
Brussels Airport	Airport	Nathan De Valck
Changi Airport Group	Airport	Jaisey Yip, Shyan Jun Lim
Miami International Airport	Airport	Jimmy Nares, Project Sponsor
Mumbai International Airport	Airport	Nandan Kanchan, R. Kalamakar
Sharjah International Airport	Airport	Jeremy Mitchell
Brinks Life Sciences	Freight Forwarder	Leandro Moreira
DHL Global Forwarding	Freight Forwarder	Nina Heinz
Expeditors	Freight Forwarder	Timothy Cop
MSD	Shipper	Debby Mattys
Pfizer	Shipper	Eddy Weygaerts
Envirotainer	Solution Provider	Stephen Maietta
3CeL	Project Manager	Céline Crahay

3. Data collection

3.1 Method

As part of the Airside Transportation Survey (ATS) project, several questionnaires were rolled out at different timelines to compile feedback and inputs.

3.2 Supply chain representation

The project received 18 respondents in total. The breakdown is illustrated in the following diagram.

Row Labels	Actual Number of Respondents
Airline	2
Airport	5
Freight Forwarder	3
Cargo Handling Agent	4
Pharmaceutical Shipper	2
Thermal Insulation SolutionProviders	2
Grand Total	**18**

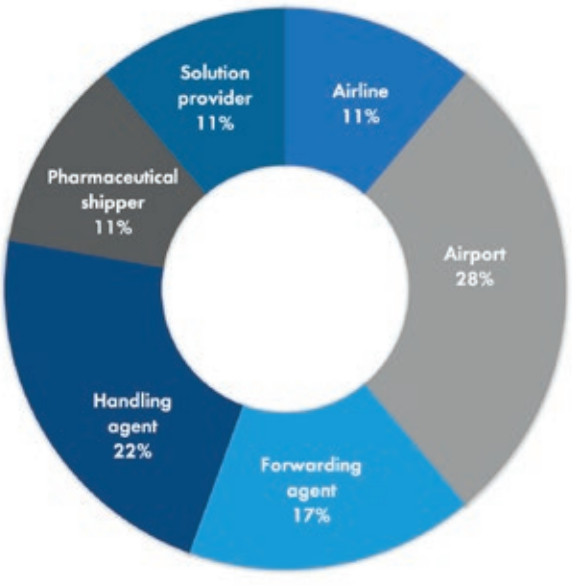

Diagram 1: Breakdown of Respondents by Supply Chain Role

4. Conclusion

4.1 Common practices

The tarmac time is a risk factor considered during the transportation journey. Airport on-tarmac risk is based on a combination of time of exposure and ambient conditions at that location. The ATS project has identified 3 main groups of common practices when it comes to minimising risks on airside transportation: On-tarmac time management, temperature mitigating solutions, and supply chain visibility.

It is important that the pharma shipment must first be declared correctly such that temperature-controlled service could be booked. General cargo would typically be stored in ambient non-temperature-controlled environment and be positioned at the aircraft bay without any controlled temperature protection, typically minimum 2 hours before Estimated Time of Departure.

4.2 Time management

Overall, tarmac time exposure varies from one airport to another depending on various factors such as layout and size of the airport, freighter versus passenger aircraft operations, etc. Managing exposure time on tarmac, between the warehouse and the aircraft is fundamental and essential.

In most airports, documented Standard Operating Procedures (SOPs) support priority management (such as Last Out of warehouse, Last In Aircraft / First Out Aircraft, First in warehouse).

An initial traffic and time simulation on airside transportation, followed by defining and monitoring the operational indicators would help identifying gaps and opportunities in the reduction of on-tarmac exposure time. An additional measure to build in reliability into the temperature control during transportation is the definition of maximum tarmac transport times in Service Level Agreements (SLA's).

Such operational indicators should be known and communicated upstream to shippers and forwarders so that the right decisions in terms of packaging are taken. The information will allow them to optimise the thermal characteristics of the passive packaging in relation to the expected temperature exposure, in order to maintain the product temperature inside the packaging within the specified transport temperature range.

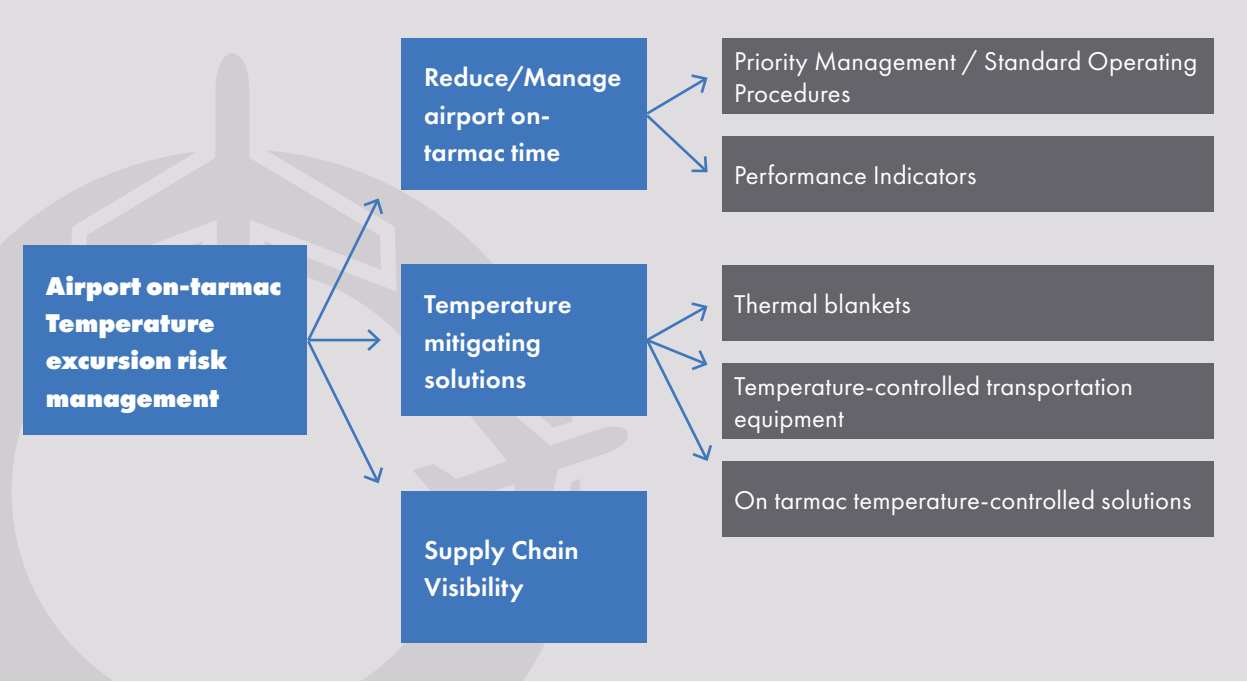

Diagram 2: Common practices identified to reduce airport on-tarmac risk

To understand and compare capabilities among airports, there would be a need for a consensus on a definition of such on tarmac time in order to accurately measure Inbound, Outbound or Transit transportation time. For example, for inbound shipments, the on-tarmac time exposure could be defined as time taken between flight arrival (chocks on) and time where the pharma cargo is being lodged into the temperature- controlled warehouse. Integration of these definitions into the IATA CEIV pharma checklist and audits would allow a standard application in all the CEIV certified entities.

4.3 Temperature mitigating solutions

4.3.1 Thermal blankets

Most respondents indicated regular use of thermal blankets, and 80% of them find them a satisfactory solution for defined ambient temperature ranges and lanes. Thermal Blankets do not have the capability to control temperatures, but they insulate the temperature sensitive product and provides protection from brief exposure to uncontrollable ambient conditions. Studies have been made by the various service providers to test different environmental conditions. Heat transfer will happen at some point in time; therefore, initial time management is crucial.

Different challenges exist depending on whether single-use blankets or re-usable blankets are used. In addition, it is critical to consider blankets providing protection on 6 sides (including bottom to protect from radiation from tarmac) as well as when the blanket is placed (ideally on preconditioned goods in a temperature-controlled environment) and when it is removed (as late as possible in the process when shipment is not anymore exposed to external environmental conditions).

When conditions such as extreme temperature, long tarmac time and / or high sensitivity of the shipment to temperature are expected, additional temperature-controlled options should be looked into.

4.3.2 Temperature-controlled transportation equipment

Temperature-controlled transportation equipment is a ground support equipment designed to keep air cargo under constant predetermined temperature range to and from an aircraft.

There are numerous technical solutions on the market, with different temperature ranges, power autonomy and types of load (lower deck, main deck, container, loose cargo). Cost may vary greatly although no tangible data has been gathered on the cost aspect. Ease of handling is a crucial aspect to be considered when sourcing a temperature-controlled transportation equipment.

A temperature mapping of the equipment in extreme seasons must be performed and would be required from the shippers to use these options.

4.3.3 On tarmac temperature-controlled solutions

Depending on the size of the airport and the transit time of the shipment, on-tarmac coolers can also be an option to protect the temperature-sensitive shipment when it is transferred between flights.

4.4 Supply chain visibility

Given the multiplicity of actors in the overall air cargo supply chain, it is imperative to have effective communication processes and transparency regarding handling capabilities and shipment conditions to drive airport-to-airport quality. The capacity to monitor and share shipment conditions (location, temperature) would give a competitive advantage to the concerned stakeholders. Airports and their partners which have implemented performance-monitoring solutions have been quoted as examples to follow.

4.5 Next steps

The Airside Transportation Survey project identifies and lists down common operational processes, measures and technical solutions that reduce the time taken and mitigate temperature excursion on airport tarmac. The project serves as a good basis for further examinations.

- A practical guide exploring the different technical solutions available on the market and mapping them against different operating environment and conditions would be of value.
- Besides the spectrum of technical solutions for on-tarmac transportation processes and equipment, the availability of airport-to-airport pharma shipments monitoring platforms should be studied.

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