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Cold chain logistics services in the business to business (B to B) sector — Requirements and guidelines for storage and transport

Services logistiques de la chaîne du froid dans le secteur du commerce interentreprises (B to B) — Cadre directeur et exigences pour le stockage et le transport

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 315, *Cold chain logistics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Steady economic growth and increasing incomes in the world in recent years have diversified food choices and created a heightened awareness of the need to maintain food freshness and safety. Such changes have led to an increase in demand for cold chain logistics services (e.g. refrigerated transport services and refrigerated storage services), primarily for foods such as agricultural and marine products and frozen foods. On the other hand, these business developments have been facing foodborne disease, as well as food loss and waste problems since some logistics service providers lack awareness and knowledge of proper operation measures for highly reliable cold chain functions for ensuring food quality.

To enhance the quality of cold chain logistics services that directly affect the condition of foods, appropriate handling of cargo, facilities, and equipment are indispensable, in addition to the development of infrastructure and equipment.

The aim of this document is to improve the quality level of local logistics services.

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Cold chain logistics services in the business to business (B to B) sector — Requirements and guidelines for storage and transport

1 Scope

This document specifies requirements and guidelines for refrigerated storage services and refrigerated transport services for foods, in the business to business (B to B) logistics sector in order to ensure that cold chains are properly maintained.

This document does not apply to logistics services for cosmetics, cigarettes, pharmaceutical and medical products, over-the-counter drugs and commercially available medicine.

This document does not apply to customs operations.

This document applies to environments where refrigeration must be created and maintained, and does not apply to environments needing to raise storage temperatures.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
food
substance (ingredient), whether processed, semi-processed or raw, which is intended for consumption, and includes drink and any substance which has been used in the manufacture, preparation or treatment of "food" but does not include cosmetics or tobacco or substances (ingredients) used only as drugs

[SOURCE: ISO 22000:2018, 3.18]

3.2
warehouse service provider
organization providing services to store cargo while keeping it at the required temperature using a *refrigerated warehouse* (3.8)

3.3
transport service provider
organization providing services either to move or distribute cargo, or both, while keeping it at the required temperature using a *refrigerated vehicle* (3.9)

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3.4
service user
organization using a *refrigerated* (3.7) storage service or a refrigerated transport service, as per the agreement with a *warehouse service provider* (3.2) or a *transport service provider* (3.3)

3.5
loading area
space or area where cargo inspection takes place before cargo loading and unloading from a *refrigerated warehouse* (3.8) during provision of *refrigerated* (3.7) storage services or during provision of refrigerated transport services

3.6
cargo transfer
activity in which cargo is moved from one *refrigerated vehicle* (3.9) to another in the middle of the transport route, before the delivery is completed at the destination

3.7
refrigerated
state where a temperature is managed at either of the following temperature range: frozen, chilled or air conditioned

Note 1 to entry: CAC/RCP 8-1976 (Code of Practice for the Processing and Handling of Quick Frozen Foods) states in Clause 4.6 that cold stores should be designed and operated so as to maintain a product temperature of -18 °C or colder with a minimum of fluctuation.

3.8
refrigerated warehouse
fixed facilities for storage of cargo, with a cooling system for keeping cargo *refrigerated* (3.7)

3.9
refrigerated vehicle
means of transport containing at least one *refrigerated compartment* (3.11) to transport *refrigerated* (3.7) cargo

3.10
refrigerated room
space managed at *refrigerated* (3.7) temperature in a warehouse

3.11
refrigerated compartment
space managed at *refrigerated* (3.7) temperature in a vehicle

4 Temperature ranges and target businesses

4.1 Temperature ranges

The temperature range applied is determined between the service provider and service user, as per the agreement.

4.2 Target businesses

The requirements and recommendations within this document focus on refrigerated storage services and refrigerated road transport services in the B to B sector. An example of target businesses is shown in Figure 1.

This document for refrigerated storage services and refrigerated transport services is applicable for logistics required for handling food by processing factories, retail shops and restaurants.

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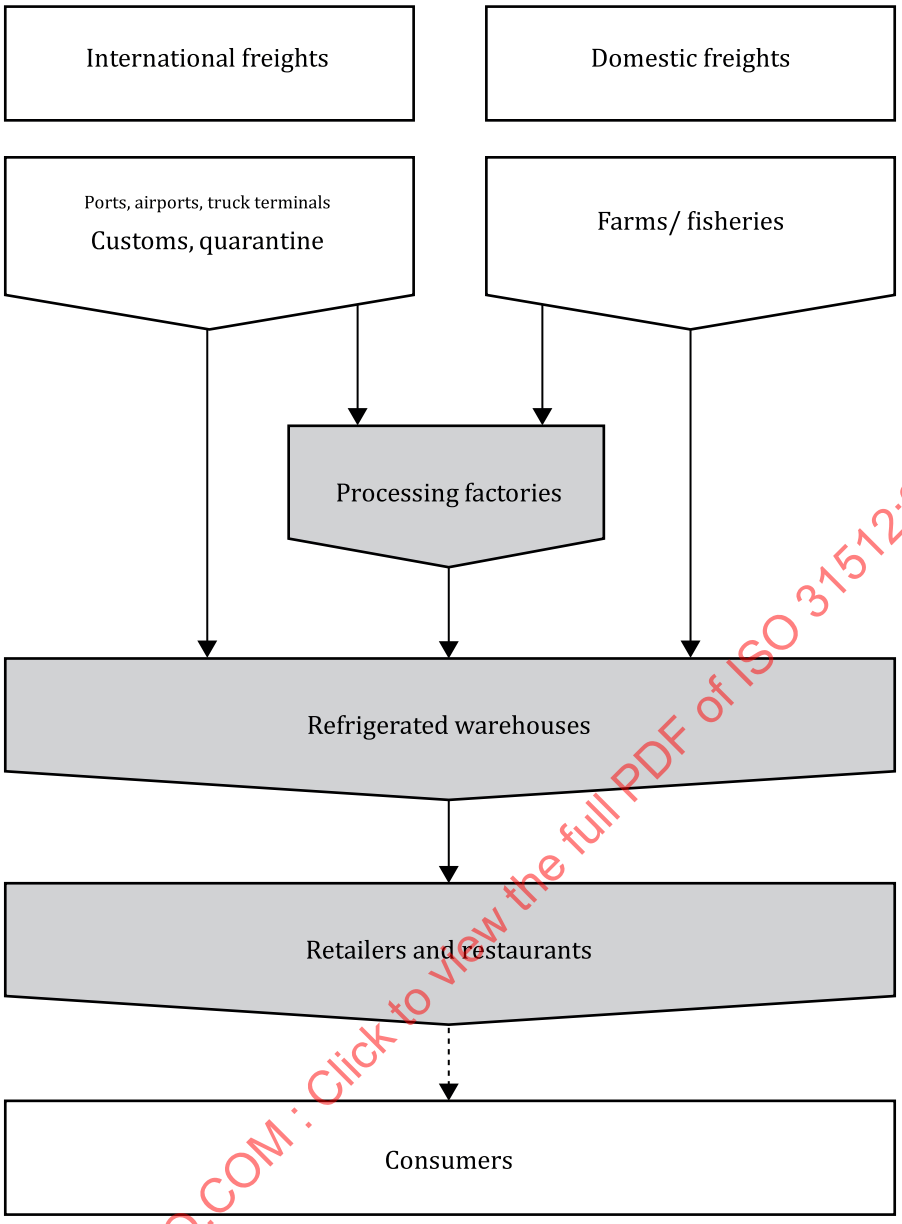

NOTE Solid lines and shaded boxes show the temperature-controlled process covered by this document, while the dotted line shows logistics from retailers or restaurants to consumers.

Figure 1 — Example of target businesses (B to B logistics)

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5 Refrigerated storage service

5.1 Confirmation of storage service condition

When a warehouse service provider receives a request for storage from a service user and they make an agreement, the warehouse service provider shall take into account how it will provide the service requested in terms of capacity and performance of facilities and equipment and storage period of the refrigerated warehouse to be used for the business.

NOTE Required temperature ranges vary depending on the type of food they store.

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An example of implementation is as follows:

— not entering into an agreement to be a vendor for the service user when the warehouse service provider cannot provide refrigerated storage service under the proposed conditions.

5.2 Unloading cargo into the refrigerated warehouse

5.2.1 Before accepting cargo from a transport service provider, a warehouse service provider shall check the following within the temperature-controlled loading area:

a) the types of cargo;

b) the quantity of cargo; and

c) whether there is any damage and soiling to the appearance of the cargo.

A warehouse service provider shall separate any cargo if it is found to be either damaged or contaminated, or both, during the warehousing process.

If a warehouse service provider finds any sign of damage or contamination with transport equipment of a transport service provider which can deteriorate the quality of cargo, the warehouse service provider shall take measures which are agreed upon with the service user.

A warehouse service provider shall check that the cargo temperature is as specified in the written agreement with the service user.

NOTE As long as the warehouse service provider can provide services that have been agreed upon with the service user, the temperature measuring method can vary depending on the country within which the refrigerated storage service is operating.

5.2.2 The warehouse service provider shall take measures to prevent temperature increases in a loading area when cargo is unloaded from the refrigerated vehicle.

Examples of implementation are as follows:

— placing cargo into the refrigerated warehouse promptly using material handling equipment such as pallets, carriages, and rollers, when accepting cargo;

— installing the dock shelter in the refrigerated warehouse so that the refrigerated vehicle can be parked in such a way that cargo is not exposed to the outside air.

5.3 Refrigerated storage

5.3.1 Warehouse service providers shall store the cargo within the temperature range that is agreed upon with the service user beforehand. Warehouse service providers shall keep a record of the temperature within the refrigerated warehouse, measured at regular intervals to enable the warehouse service provider to provide proof of the cargo having been stored at the required temperature.

Examples of implementation are as follows:

— installing temperature-measuring devices inside the refrigerated warehouse;

— storing refrigerated cargo in a refrigerated warehouse at a temperature range that is agreed upon with the service user beforehand, taking into account the temperature and humidity of the outside air;

— monitoring and recording the temperature in real time;

— building a system to send an alert when there are abnormal occurrences, such as the temperature inside the refrigerated warehouse greatly deviates from the pre-set temperature range;

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— preparing a procedure in advance to assess the impact of the above temperature alert on cargo temperature adherence when it exceeds the agreed threshold with the service user.

5.3.2 Warehouse service providers shall keep a record of the exact location of the cargo stored inside the refrigerated warehouse so that any cargo can be found easily and without fail. Warehouse service providers shall conduct inventory checking.

NOTE Sampling is conducted if requested by the service user. If a warehouse service provider finds any sign of damage or contamination, measures are taken in accordance with the agreement with the service user.

Examples of implementation are as follows:

— identifying the cargo stored in the refrigerated warehouse and recording these references with the exact location;

— using storage space inside the refrigerated warehouse efficiently by loading cargo onto pallets or racks and placing one over the other, paying attention to the strength of the cargo;

— using the warehouse management system (WMS) to securely manage the inventory including information such as batch number and expiration date.

5.3.3 Warehouse service providers shall take measures, such as keeping the doors of the refrigerated warehouse closed when not loading or unloading cargo, to prevent the temperature inside the refrigerated warehouse from rising.

Examples of implementation are as follows:

— opening and closing the doors of the refrigerated warehouse promptly;

— deploying air curtains or strip curtains when door is open.

5.4 Handing over cargo from the refrigerated warehouse

Before warehouse service providers hand over the cargo to the transport service providers, warehouse service providers shall check the following within the temperature-controlled loading area:

a) the types of cargo;

b) the quantity of cargo;

c) whether there is any damage and soiling to the appearance of the cargo; and

d) the temperature condition of the cargo, within the temperature-controlled loading area.

The warehouse service providers and the transport service providers should jointly check the following points if they agree:

— whether the transportation equipment of the transportation service providers is in good sanitary condition;

— whether the transportation equipment of the transportation service providers is pre-cooled in advance and meets the temperature that was agreed upon with the service user;

— the information about the cargo against the shipping instruction.

EXAMPLE Information about the cargo can include production date, expiration date and batch number.

An examples of implementation is as follows:

— ensuring coordination and cooperation between warehouse service providers and transport service providers in order to achieve a seamless cold chain logistics service.

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5.5 Ensuring safety, hygiene and security

5.5.1 Warehouse service providers shall take measures for hygiene management since their workers handle food in a refrigerated warehouse.

Warehouse service providers shall take measures to prevent the outbreak of pests. In case any pests are found, they should be exterminated in a manner that does not affect any cargo stored.

5.5.2 Warehouse service providers shall take safety measures for the facilities and the equipment. The health of the workers shall be properly managed so that they can work safely in a refrigerated warehouse.

Examples of implementation are as follows:

— requiring workers to wear protective equipment adapted to the cold and the risks to workers, such as safety shoes;

— providing appropriate break times for workers;

— ensuring a sufficient level of illumination inside the refrigerated warehouse to enable the workers to visually inspect the status of cargo;

— communicating thoroughly to the workers the information about the method to communicate from inside to outside at the time of emergency and the method to escape outside;

— setting the maximum hours of continuous work inside the refrigerated warehouse.

5.5.3 Warehouse service providers shall take measures to prevent loss or theft of cargo from the refrigerated warehouse and shall set measures for foods to avoid contamination.

Examples of implementation are as follows:

— locking the doors of the refrigerated storage area during non-business hours;

— inspecting the personal belongings of each person departing the refrigerated warehouse including each worker leaving the refrigerated warehouse, in the case that cargo theft from the refrigerated warehouse occurs frequently;

— prohibiting personal belongings from the refrigerated warehouse;

— prohibiting undesirable items from the refrigerated warehouse;

EXAMPLE Stapler needles, utility knife blades, clips and double clips.

— using cameras for either recording or monitoring, or both, the entry and exit times of non-personnel arriving and departing the refrigerated warehouse.

5.5.4 Warehouse service providers shall establish preventive measures in advance for the refrigerated warehouse to maintain temperature inside the warehouse during power outages.

Examples of implementation are as follows:

— instructing workers to make efforts in maintaining the required temperature inside the refrigerated warehouse by keeping doors closed until power is restored;

— ensuring that the refrigerated warehouse can be managed and operated by installing an emergency power source in case it is needed for the operation of the refrigerated warehouse during a power outage.

5.6 Education and training

5.6.1 Warehouse service providers shall provide necessary training programs to workers to ensure that items specified in 5.2 to 5.5 can be carried out.

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NOTE The quality of cargo can deteriorate to the point where it can damage consumers' health if cargo that needs temperature control is not handled appropriately in the refrigerated warehouse. This can lead to challenges for the warehouse service provider, as well as to societal issues.

Examples of implementation are as follows:

— providing training programs on operation and handling of the facilities and the equipment such as refrigerated rooms, as well as on safety and hygiene management;

— providing the opportunity for on-the-job training (OJT) for newly hired workers so they can work alongside experienced workers who can provide guidance and instruction;

— utilizing the training curriculum regarding cold chain logistics management provided by relevant organizations.

5.6.2 Warehouse service providers shall prepare and share manuals that summarize facilities and equipment, such as refrigerated rooms, the operational method, and measures to ensure safety, hygiene and security with workers, in order to ensure that workers understand the latest operations of refrigerated warehouses and are able to handle the cargo appropriately.

Examples of implementation are as follows:

— sharing information with workers, and facilitating worker understanding of the latest refrigerated warehouse operations through training;

— preparing and developing the manuals with visual aids such as charts and photos, and sharing it with workers to enhance cargo handling proficiency.

5.7 Maintenance and management of devices, equipment and facilities

Warehouse service providers shall implement measures so that refrigerated rooms can be operated safely and efficiently.

Examples of implementation are as follows:

— inspecting equipment and facilities of the refrigerated warehouse periodically, according to the manual related to rules and standards, and repairing them promptly when any defect is found;

— inspecting devices of the refrigerated warehouse periodically in accordance with the manuals;

— inspecting for any defects in the doors to the refrigerated rooms and other equipment when anything unusual is detected in the temperature inside the refrigerated warehouse.

6 Refrigerated transport service

6.1 Confirmation of transport service condition

When a transport service provider receives a request for transportation from a service user and they make an agreement, the transport service provider shall take into account how it will provide the service requested in terms of the availability of the transportation equipment and the transportation duration needed for the transport.

NOTE Required temperature ranges vary depending on the types of food they transport.

An example of implementation is as follows:

— not entering into agreement to be a vendor for the service user when the transport service provider cannot provide refrigerated transport service under the proposed conditions.

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6.2 Loading cargo into the refrigerated vehicle

6.2.1 Transport service providers shall check the temperature inside the refrigerated vehicle before loading the cargo into it. Transport service providers shall load the cargo only after making sure the temperature inside the refrigerated vehicle is appropriate.

Before loading the cargo, transport service providers shall check the following within the temperature-controlled loading area before loading the cargo:

a) the types of cargo;

b) the quantity of cargo;

c) whether there is any damage to the appearance of the cargo; and

d) the temperature condition of the cargo.

Transport service providers shall check that information about the cargo such as production date, expiration date, shelf life and batch number adheres to that agreed upon with the service user.

6.2.2 Transport service providers shall take measures to prevent cargo from being exposed to the outside air and to prevent the temperature from rising, so as not to deteriorate the quality of cargo when it is loaded into the refrigerated vehicle.

Examples of implementation are as follows:

— setting the maximum duration for the cargo to be exposed to the outside air;

— using the forklift for loading the cargo into the refrigerated vehicle, to make the transfer as quickly as possible.

6.3 Transport

6.3.1 Transport service providers shall transport the cargo at the temperature range that is agreed upon with the service user beforehand. Transport service providers shall monitor and record the temperature inside the refrigerated vehicle at appropriate timings. Transport service providers may check the temperature during transportation.

Examples of implementation are as follows:

— installing temperature management equipment which will regularly record the temperature;

— building a system to send an alert when there are abnormal occurrences such as the temperature inside the vehicle greatly deviating from the pre-set temperature range;

— instructing drivers of the refrigerated vehicles to maintain the pre-set temperature range that is agreed upon with the service user;

— identifying the cause of abnormal occurrences and take corrective measures.

6.3.2 Transport service providers shall designate and identify who drives the refrigerated vehicles. Transport service providers shall train these drivers to adhere to safe driving and good driving practices to prevent damage to cargo during transport.

Examples of implementation are as follows:

— installing a global positioning system (GPS) and a digital tachograph;

— instructing drivers to improve their driving practices, such as avoiding sudden starts and stops and making abrupt steering manoeuvres;

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— instructing drivers about the care of the cargo in order to keep the cargo from collapsing during transport.

6.4 Transferring and unloading

6.4.1 Transport service providers shall take measures to prevent cargo from being exposed to the outside air and to prevent the temperature from rising so as not to deteriorate the quality of the cargo when a driver of a refrigerated vehicle transfers cargo.

Examples of implementation are as follows:

— transferring cargo quickly by facing the rear doors of the vehicles in contact with each other, when cargo is to be transferred between multiple refrigerated vehicles outdoors;

— keeping the door closed whenever possible throughout the operation;

— loading the cargo within the maximum limit of the time permittable for the cargo to be exposed to the outside air.

6.4.2 Before the cargo is transferred to the place designated by the service user, drivers of refrigerated vehicles shall check the following within the temperature-controlled loading area:

a) the types of cargo;

b) the quantity of cargo;

c) whether there is any damage and soiling to the appearance of the cargo.

Examples of implementation are as follows:

— checking that the temperature condition of the cargo is maintained before the cargo is unloaded from the refrigerated vehicles;

— not placing the cargo directly on the ground;

— handing over cargos in temperature-controlled areas.

6.5 Ensuring safety, hygiene and security

6.5.1 Transport service providers shall take measures to ensure hygiene management is practiced by drivers of refrigerated vehicles who handle cargo.

Examples of implementation are as follows:

— requiring drivers of refrigerated vehicles to wear gloves and clean work clothes and safety shoes;

— cleaning the refrigerated vehicles periodically.

6.5.2 Transport service providers should instruct drivers of refrigerated vehicles to adhere with traffic rules and to improve driving practices in order to prevent traffic accidents. In addition, transport service providers shall implement measures in advance to prepare for the case that drivers of refrigerated vehicles will encounter traffic accidents. An emergency plan and measures shall be established for accidents that can occur in the process of transportation.

Examples of implementation are as follows:

— installing a GPS on the refrigerated vehicle to monitor driving conditions;

— contacting drivers to confirm their safety if an unscheduled situation is identified, such as parking for too long;

— encouraging drivers to use wheel stops on parking.

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6.5.3 Transport service providers shall take measures to prevent loss or theft of cargo during transport, that can be applied by drivers of refrigerated vehicles.

Examples of implementation are as follows:

— ensuring that drivers lock their vehicles or ensuring they have system to detect open doors when driving, and that they do not unlock them unless it is necessary to;

— requiring drivers to take measures, such as door locking when leaving the vehicle, in order to prevent the theft of the vehicle.

6.5.4 Transport service providers should establish a safe transport route so that the drivers of the refrigerated vehicle can transfer the cargo to the place designated by the service user on time with certainty.

Examples of implementation are as follows:

— establishing a safe transport route, considering weather forecasts, traffic information such as the occurrence of traffic congestion, and past transport time;

— ensuring safe and efficient transport route, the transport service provider and drivers exchange traffic information.

6.6 Education and training

6.6.1 Transport service providers shall provide necessary training programs to drivers of refrigerated vehicles so that items specified in 6.2.1 to 6.5.3 can be carried out securely.

NOTE The quality of the cargo can deteriorate to the point where it can damage consumers' health if the cargo that needs temperature control is not handled appropriately in refrigerated vehicles. This can lead to trouble for the transport service provider, as well as to a societal issues.

Examples of implementation are as follows:

— providing training programs about operation and handling of the facilities and the equipment such as refrigerated compartment, and about safety and hygiene management;

— providing the opportunity for OJT for newly hired drivers so they can work alongside experienced drivers who can provide guidance and instruction;

— utilizing the training curriculum regarding cold chain logistics management provided by relevant organizations.

6.6.2 Transport service providers shall prepare and share manuals that summarize facilities and equipment, such as refrigerated compartment, the operational method, and measures to ensure safety, hygiene and security with drivers, in order to ensure drivers understand the latest operations of refrigerated vehicles and are able to handle the cargo appropriately.

Examples of implementation are as follows:

— sharing the information with the drivers, and facilitating driver understanding of the latest refrigerated vehicle operations through training;

— preparing and developing the manuals with visual aids such as charts and photos, and sharing it with the drivers to enhance cargo handling proficiency.

6.7 Maintenance and management of equipment and facilities

Transport service providers shall take measures for equipment and facilities to be operated safely and efficiently.

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