Germanischer Lloyd Certification & Cool Chain Association - Cool Chain Quality Indicator Standard (CCQI)

15th February 2008, Version 2.0

COOLCHAINASSOCIATION

GL OPERATING 24/7

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Cool Chain Quality Indicator Standard -

The Concept of Cool Chain Quality

Version: 2.0

Replaces Version: 1.5

Released: 2008-02-15

Version: 2.0
Date: 2008-02-15

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Version: 2.0
Date: 2008-02-15

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1 Introduction

The Cool Chain Quality Indicator (CCQI) Standard has been established by the Cool Chain Association (CCA) and Germanischer Lloyd (GL).

The CCQI Standard specifies a cool chain related quality management system where an organization, which aims to be certified according to this standard, demonstrates its ability to consistently provide high quality cool chain services combined with the organizational attitude for continuous improvement.

The CCQI Standard establishes an auditable quality management system which is based on risk assessment and management system components. It focuses on precautions aiming to maintain the preferred and individual band of environmental conditions for Perishables and Temperature Sensitive Products (PTSPs) throughout the whole cool chain. The basis for the achievement of these goals is inherent to the name “cool chain”: It is professional control over temperature along the supply chain using adequate means of handling, storage and transport.

The CCQI Standard subdivides the cool chain into major links called operations. These operations cover the individual cool chain stages. The application of the Cool Chain Quality Indicator Standard allows a benchmarking between the same type of operations within different organizations / companies.

The cool chain certificate is a label for high quality cool chain operation and provides transparency for the cool chain reliability and quality related capabilities of an organization.

2 Application of the CCQI Standard

The CCQI Certificate can be awarded to organizations that

- are members of the Cool Chain Association, and
- actively and directly take part in logistic operations related to PTSPs, and
- operate own or long term leased cool chain related equipment.

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Typical logistic operations in the Cool Chain are depicted below.

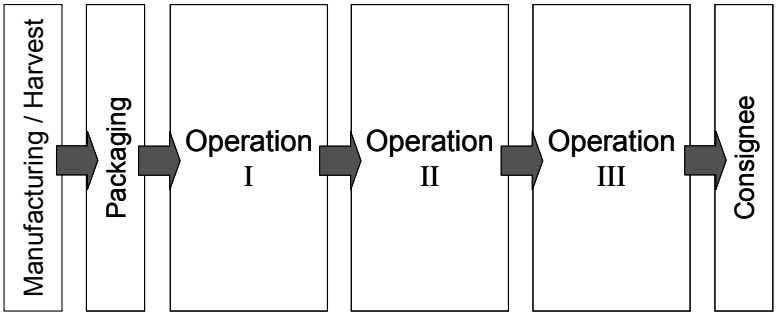

Figure 1: Logistic Operations in the Cool Chain

Quality indicators have been developed for 15 operations as described in more detail in section 4.

A CCQI Certificate will be issued for one or more operations.

The requirements specified in this CCQI Standard are the basis for certification by the Certification division of Germanischer Lloyd (GLC).

3 Overview of the CCQI Standard and Process of Certification

This standard is a Quality Management System consisting of two main parts:

1. Cool Chain Quality Indicators (CCQI) provide indicators - the CCQI points - as the result of a quantitative assessment of cool chain quality for individual operations,
2. Cool Chain Quality conformance checks for conformity to be fulfilled.

Both parts together are setting an incentive to improve the cool chain operation to high quality standards allowing at the same time a comparison of different organizations performing the same type of operation.

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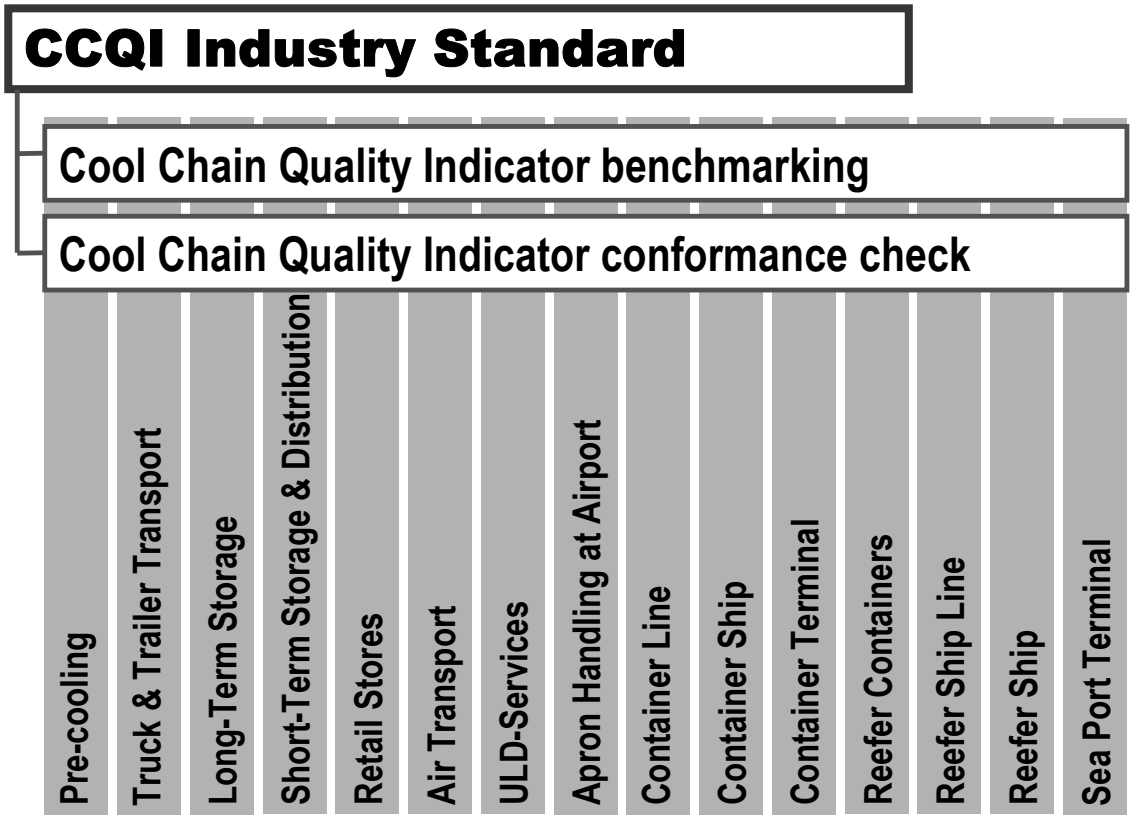

Figure 2: Systematic of the CCQI Industry Standard

To qualify for certification it is a precondition that

- the overall CCQI points awarded per operation (section 4.3) matches or exceeds the benchmark level defined under section 6.1,
- all elements of this standard specified for the Cool Chain Quality Conformance are implemented.

3.1 Cool Chain Quality Indicators (CCQI)

The CCQI assessments have been developed from a risk based approach taking into consideration relevant hazards to PTSPs. Cool Chain Quality Indicators offer a quality measure for the staff competence, employed equipment and methods. CCQI values are determined by CCQI Master

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Tables and can range from 0 points (low quality cool chain operation, high risk of temperature deviation) to 100 points (high quality cool chain operation, low risk of temperature deviation).

3.2 Cool Chain Quality Conformance Requirements (CCQC Requirements)

The Cool Chain Quality Conformance Requirements (section 5) are tailored to the needs of the PTSP transport industry and include mandatory as well as recommended practices for a high quality management of the cool chain operation. The requirements of this part of the standard need to be incorporated into the documented management system (internal manual) of an organization that is seeking certification by GLC and wishes to maintain this certificate. A cross reference table shall be available detailing the documentation references for sections 4.1 and 5.1 to 5.9 of this standard.

3.3 Process of Certification

The certification is carried out exclusively by Germanischer Lloyd Certification (GLC), its subsidiaries and subcontractors.

The CCQI certificate shall be issued by GLC to organizations or parts of organizations who have successfully demonstrated, during external audits, that they have documented, implemented and maintained all requirements of this standard.

The steps for certification are:

- Documentation of the requirements of this standard within a cool chain related management system of the organization (“company internal manual”)
- Implementation of the cool chain related management system within the entire organization. This includes the completion of the CCQI master tables for all respective cool chain operations with own and/ or long term leased hardware as well as implementation of all mandatory requirements as described in section 5.
- Internal audits and management review carried out by the organization itself.

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- Successful pass of an external audit by demonstrating to GLC auditors that the CCQI master tables are correctly completed, the CCQI points are properly calculated, the benchmarks of the CCQIs are reached and that no major non-conformity exists.
- Issuance of the certificate by GLC specifying exactly the part of the organization actually certified.

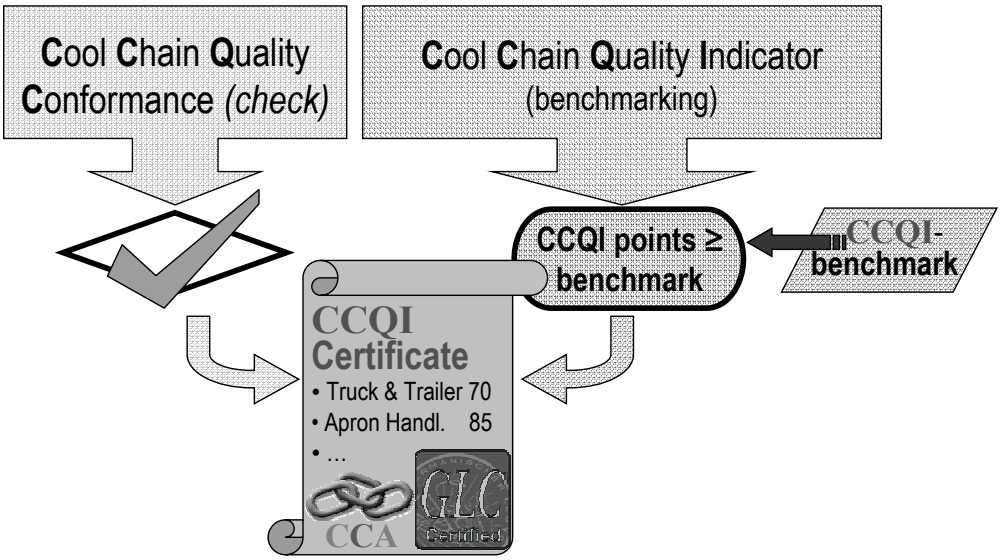

Figure 3: Certification Process in the Cool Chain Quality Management System.

4 Cool Chain Quality Indicators (CCQIs)

4.1 List of Operations

CCQI Master Tables have been developed for the following cool chain operations:

- Pre-cooling
- Truck & Trailer Transport
- Long Term Storage
- Short Term Storage / Distribution Center
- Retail Stores
- Air Transport

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- ULD Services
- Apron Handling at Airports
- Container Line
- Container Ship
- Container Terminal
- Reefer Containers
- Reefer Ship Line
- Reefer Ship
- Sea Port Terminal

The organization shall provide and maintain a list of all its operations related to the cool chain that belong to one of the above mentioned operations and that belong to the operational unit that certification is sought after (e.g. North America / Amsterdam / …). For each operation the list shall include the description of the operation, the type of operation, the geographical location, a unique reference number and the CCQI points that have been achieved by completion of the Master Tables (see item 4.2).

Subdivisions or aggregation of operations should be made based on organizational structures and on criteria accounting for the regional, technical or operational similarities. For example the truck fleets based in two different countries should be handled separately. In case of ships each ship is treated as one geographical location.

The following table shows an example how the list of operations could look like.

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World Logistic Group

List of Operations

No.	Description of operation / Company Name	Type of operation	Geographical Location	CCQI Points
1	World Logistic Deutschland GmbH: Trucking Services based at German Airports	Truck & Trailer	Germany	72
2	World Logistic Netherlands BV: Trucking Services based at Dutch Airports	Truck & Trailer	Netherlands	90
3	World Locistic France SA: Trucking Services based at French Airports	Truck & Trailer	France	65
4	World Air Cargo Ltd.: Aviation Division	Aircraft	London	71
5	WL Ground Services Deutschland GmbH: Transport to / from aircrafts at Frankfurt Airport	Apron Handling	Frankfurt	72
6	WL Ground Services Deutschland GmbH: Perishable Center at Frankfurt, Flughafenstrasse 23	Short Term Storage	Frankfurt	81
7	WL Ground Services Netherlands BV: …	Apron Handling	Amsterdam	68
8	WL Perishables Netherlands BV: …	Short Term Storage	Amsterdam	83
9	…	Apron Handling	Paris	63
10	…	Short Term Storage	Paris	73

This example is fully fictive and does not show the operation of any real company.

Table 1: Example of List of Operations

4.2 Guidance for Use and Completion of the Individual CCQI Master Tables

For each cool chain related operation that has been identified by the organization and that is included in the list of operations the CCQI points shall be determined by completion of one CCQI Master Table as shown in ANNEX II.

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By filling out the CCQI Master Tables technical, organizational and educational aspects of the operation will be checked and evaluated. The organization shall fill out CCQI Master Tables for all operations identified in the list of operations mentioned above as part of the organizational unit that applies for a CCQI certificate.

The reference number of the operation as provided in the list of operations (see section 4.1) shall be stated in the upper left corner of the respective Master Table.

The Master Tables include one column with further explanations. The reason(s) for the individual ratings shall be explained in the column “Comments”.

If within one operation the analysis of a fleet of objects (for example trucks based at one airport) is necessary, the arithmetic average[1] of CCQI points of all objects rounded towards the nearest higher integer is calculated independent of the usage or importance of the individual object.

Within the following chapters the application of the Master Tables for the different types of operations is described.

4.2.1 Pre-cooling CCQI

This CCQI applies for producers and manufacturers of perishable and temperature sensitive products (PTSP) such as growers, pack houses, food processors, pharmaceutical manufacturers and others. Only companies may be certified that condition PTSP to a predefined temperature. This may occur directly after production (harvest, packaging, processing, manufacture etc.) or at a later stage of the cool chain (e. g. re-cooling of cut flowers).

[1] Arithmetic average: sum of CCQI points of objects divided by the number of objects; also called “mean value”.

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The company shall define the pre-cooling process (as shown in figure 4) for each product to be pre-cooled. This pre-cooling process definition shall include:

- description of product[2] including dimensions and weight of pack unit and type of packaging (if packed)[3]
- allowable maximum time and transport mode from harvesting / producing / fishing / manufacturing / accepting to start of pre-cooling
- maximum product temperature before pre-cooling
- required core temperature after pre-cooling (in case of deep frozen products a maximum temperature of -18 °C or colder shall be defined)
- minimum pre-cooling time to reach the required core temperature
- detailed description of the pre-cooling process (as applicable: equipment to be used, air flow, temperature regime, special treatments etc.)

[2] Product description shall include size, cut, weight or ripening grade etc. that have an influence on the pre-cooling process.
[3] If products are produced with different packaging (size, shape, material etc.) one pre-cooling process definition shall be issued for each combination of product and packaging

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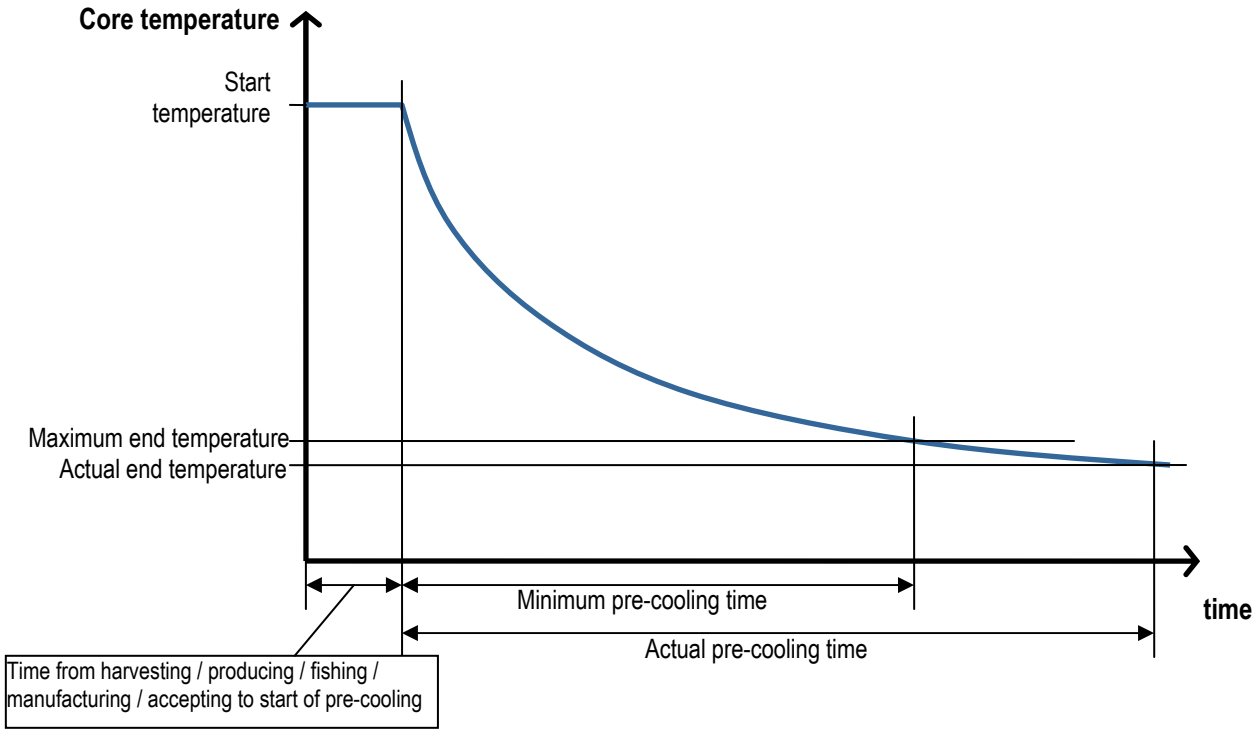

Figure 4: Pre-cooling process with relevant parameters.

The company shall conduct the pre-cooling process as defined and shall measure and record the core temperature **before** and **after** pre-cooling at regular intervals suitable for the specific pre-cooling process.

If cold store rooms are used for cooling down of products they are regarded as part of the pre-cooling equipment. If cold store rooms are used for storage of pre-cooled products they shall be evaluated by using the short-term or long-term storage CCQI master tables. Cold store rooms that are used for both, pre-cooling and storage, (e. g. cold rooms with forced air pre-coolers), shall be evaluated by using the master tables for pre-cooling AND storage.

If the company provides packaging to PTSP the type of packaging shall be suitable for the pre-cooling process (i. e. air flow and heat removal requirement during pre-cooling, transport and storage).

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In case that the company provides re-cooling services (e. g. at a short term storage / distribution center) the certificate shall state “Re-cooling” instead of “Pre-cooling” as operation.

4.2.2 Truck and Trailer Transport CCQI

This CCQI applies for trucks and trailers that operate in long distance / international road transport or in local distribution services. It does not apply for transports that directly belong to another cool chain operation like e.g. the transport of cargo on the apron of an airport or within a warehouse.

The CCQI master table “Truck & Trailer” consists of the following parts

A	Organization
B	Transport equipment / vehicles (summary of vehicle fleet)
B1	Transport equipment used for long distance and / or international transportation
B2	Transport equipment used for local distribution

Part A “Organization” is used to evaluate the organization / the operator as a whole and is to be completed once per organization.

Part B (including part B1 and part B2) is used to evaluate vehicles and their accessories. Part B1 is to be completed for vehicles which are used for long distance and / or international transportation. Part B2 is to be completed for vehicles which are used for local distribution services. In case vehicles are used for both, long distance / international transportation and local distribution, part B1 and part B2 shall be completed.

Part B1 and part B2 shall be used for single vehicles or groups of vehicles of same type and same scope of accessory. For each group of vehicles one B1 and/or B2 table shall be completed, including an attached list of associated vehicles stating their unique identification (e.g. license plate).

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Example: The overall CCQI for a Truck and Trailer fleet consisting of 70 vehicles in total, of which 50 vehicles (three different types) used for long distance transportation and 20 vehicles (two different types) for distribution services shall be calculated as follows:

CCQI - Organization	28 pts
CCQI - Transport equipment (long distance) type A, 25 vehicles	48 pts
CCQI - Transport equipment (long distance) type B, 15 vehicles	43 pts
CCQI - Transport equipment (long distance) type C, 10 vehicles	50 pts
CCQI - Transport equipment (local distribution) type D, 12 vehicles	40 pts
CCQI - Transport equipment (local distribution) type E, 8 vehicles	22 pts
Overall CCQI truck and trailer = 28+ (25x48 + 15x43+10x50+12x40+8x22)/70 =	70,9 pts

The relevant CCQI points for the operation shall be computed as the sum of the CCQI assessment for the organizational part plus the arithmetic average of the CCQI assessment for the fleet of transport equipments and this number rounded towards the nearest higher integer.
Thus the CCQI value for the example given is 71 pts.

Generally, all vehicles used for the carriage of PTSP shall be taken into account for the calculation of overall CCQI regardless how often they are in use.

4.2.3 Long Term Storage CCQI

This CCQI applies to long term cold stores which have adequate cold rooms. Storage may last from one day to several months. It does not apply to cooling-down or quick-freezing installations which are used during production of PTSPs.

Where long term storage and short term storage / distribution is carried out within a single facility, one master table is to be completed for each type of storage.

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4.2.4 Short Term Storage / Distribution Center CCQI

This CCQI is used for all kinds of handling- / storage- and distribution centers where PTSP are accepted, checked, prepared, distributed, repacked, sorted or handled otherwise. It applies to handling facilities at airports as well as to retailer distribution centers that are equipped with refrigerated spaces.

In any case this CCQI is applicable to airport handlers. The entire operation at an airport will usually be covered by not less than one apron handling CCQI and one short term storage CCQI.

If the company provides re-cooling services it is recommend that the re-cooling facilities are evaluated using the CCQI Pre-cooling master table.

4.2.5 Retail Stores CCQI

This CCQI applies to all kinds of retail stores where perishable foodstuffs are offered for sale to the end consumer, e.g. convenience stores, butcheries, delis, discounters, super- and hypermarkets. This part may equally be applied to wholesalers involved in trading of perishable foodstuffs. The CCQI master table “Retail stores” consists of the following parts:

A Organization

B Store Equipment

C Display Cabinets

Part A “Organization” is to be completed for each retail store. It is taken for granted that the principles of HACCP are implemented and maintained by the retail store operator. The hygienic aspects of this master table are therefore limited to those items which are not specifically addressed in HACCP.

Part B “Store equipment” includes those parts of the retail store, where perishable foodstuffs are presented for sale, stored or processed including associated equipment relevant for maintaining the cool chain.

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Part C “PTSP Display cabinets” is used for final calculation of the average points of all display cabinets and shelves which are permanently installed. Temporary installed display cabinets are excluded. A list of all refrigerated and non-refrigerated display cabinets used for the presentation of perishables including information about display area (see below), temperature range and CCQI points shall be available. These display cabinets shall be evaluated individually by using the following master tables:

C.1 Fruit and vegetable display

C.2 Chilled display cabinets

C.3 Deep frozen display cabinets

C.4 Refrigerated service counter

C.5 Fish & seafood display.

Where different display cabinet models are in use within the same product group (e.g. deep frozen products), table C.3 shall be completed for each display cabinet model. By means of table C the evaluation of different display cabinet models is finally averaged in consideration of their display opening areas of each display cabinet model. The same applies to fruits and vegetables were part of these products may be presented for sale on non-refrigerated shelves or tables in

- a non refrigerated area
- an air conditioned area
- a refrigerated area or
- are presented in refrigerated display cabinets

Table C.1 is to be completed in either case and weighted by their display area (m² - see below).

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Example: The CCQI points shall be calculated for different display cabinet models and shelves used for different product groups:

Kind of perishables display	Total display area	Points
Fruit and vegetable display type 1 acc. to table C.1	12 m²	25 pts
Fruit and vegetable display type 2 acc. to table C.1	4 m²	35 pts
Fruit and vegetable display type 3 acc. to table C.1	10 m²	30 pts
Chilled display cabinet type 1 acc. to table C.2	13 m²	31 pts.
Chilled display cabinet type 2 acc. to table C.2	8 m²	22 pts.
Deep frozen cabinet type 1 acc. to table C.3	13 m²	34 pts.
Deep frozen cabinet type 2 acc. to table C.3	21 m²	26 pts
Refrigerated service counters acc. to table C.4	16 m²	23 pts.
Fish & seafood display acc. to table C.5	4 m²	28 pts.

The overall CCQI for a.m. refrigerated display cabinets and shelves is calculated acc. table C:

(12x25+4x35+10x30+13x31+8x22+13x34+21x26+16x23+4x28) / 91= 30,6 pts **31 pts.**

Calculation of display areas:

In case of open shelves (e.g. fruits and vegetables, fish and seafood) the display area is calculated by the exposed surface area of shelves.

In case of horizontal or sloped non-refrigerated tables for fruit and vegetables, the display area is calculated by the actual dimensions of the displayed area (length x breadth).

In case of horizontal type chilled or deep frozen cabinets, the display area is calculated by the horizontal opening area (length x breadth, using internal dimensions).

In case of vertical type chilled or deep frozen cabinets, the display area is calculated by the vertical opening area (height x breadth, using internal dimensions)

In case of combi type chilled or deep frozen cabinets consisting of vertical and horizontal display, the actual display area is calculated by the air curtain area.

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All display cabinets and shelves used for deep frozen and fresh products shall be evaluated by means of the master tables C.1 – C.5.

The final evaluation of a retail store is then to be carried out as follows:

Example: The overall CCQI for a retail store consisting of display cabinets of different type shall be calculated as follows:

CCQI- Organization (master table part A)	25 pts
CCQI- Store equipment (master table part B)	31 pts
CCQI- PTSP Display cabinets (master table part C)	31 pts
Overall CCQI Retail store = 25+31+31 points =	**87 pts**

4.2.6 Air Transport CCQI

This CCQI is used for aircraft of all types that are used for the transport of PTSPs including their flight preparation. The CCQI master table "Air transport" consists of the following parts:

A Organization
B Aircraft

Part A "Organization" is used to evaluate the organization / the operator as a whole and is to be completed once per organization.

Part B "Aircraft" is used to evaluate aircraft and their accessories. Part B shall be used for a single aircraft or groups of aircraft of same type and same scope of accessory.

For each group of aircraft one B table shall be completed, including an attached list of associated aircraft stating their unique identification (e.g. call sign).

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Example: The overall CCQI for an aircraft fleet consisting of 20 aircraft in total shall be calculated as follows:

CCQI – Organization	31 pts
CCQI- Aircraft type A, 5 aircraft	32 pts
CCQI- Aircraft type B, 8 aircraft	19 pts
CCQI- Aircraft type C, 7 aircraft	50 pts
Overall CCQI Aircraft = 31+ (5x32 + 8x19 + 7x50)/20 = 64.1 pts	**65 pts**

Generally, all aircraft used for the carriage of PTSP shall be taken into account for the calculation of the overall CCQI regardless how often they are in use.

4.2.7 ULD Services CCQI

This CCQI evaluates temperature controlled ULDs (Unit Load Devices) of all types that are used for the transport of PTSPs including their flight preparation, maintenance and servicing. The CCQI master table "ULD Services" consists of the following parts:

A Organization
B Temperature Controlled ULDs

Part A "Organization" is used to evaluate the organization / the operator as a whole and is to be completed once per organization that offers ULD services. This can be an airline that operates own temperature controlled ULDs or a third party service provider who leases out the equipment to airlines.

Part B "Temperature Controlled Equipment (ULDs)" is used to evaluate ULDs and their accessories. Part B shall be used for a single ULD or groups of ULDs of same type and same scope of accessory.

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For each group of ULDs one table B shall be completed, including an attached list of associated ULDs stating their unique identification (e.g. maker, model / type, identification number). The fleet average will be calculated as described in section 4.2.1 “Truck and Trailer Transport”.

Example: The overall CCQI for ULD services for a ULD fleet of 100 ULDs consisting of three different types shall be calculated as follows:

CCQI – Organization			39 pts
CCQI- ULD type A, 50 ULD			41 pts
CCQI- ULD type B, 30 ULD			35 pts
CCQI- ULD type C, 20 ULD			37 pts
Average CCQI-ULD = (50x41 + 30x35 + 20x37) / 100 =	38.4 pts	→	39 pts
Overall CCQI-ULD Services = (39 + 39) =			**78 pts**

Generally, all ULDs used for the carriage of PTSP shall be taken into account for the calculation of the overall CCQI regardless how often they are in use.

4.2.8 Apron Handling at Airports CCQI

This CCQI is used for the transport between the handling center at an airport and the aircraft. This operation mainly takes place on the airport’s apron. The handling center can be either an airport terminal, a dedicated perishable center or any other ground facility where the cargo is accepted, checked, prepared, distributed or handled otherwise. Therefore the operation at an airport has to be covered by not less than one apron handling CCQI and one short term storage CCQI. If several handling centers are located at an airport one Apron Handling CCQI has to be completed for each handling center.

If several types of transport equipment are in use (see B.1) their respective point numbers per type are to be multiplied by their corresponding points and to be averaged.

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Example: Five open trucks with 3 points each and four temperature controlled trucks with 20 points each will be averaged to: (5x3 + 4x20) / 9 = 10,6 points → 11 points

4.2.9 CCQIs for Ocean Transport with Containers

In order to represent the special contractual relations within the container shipping industry in a suitable way there is a total number of four CCQI master tables to cover reefer container shipping (see also Fig. 5):

1) "Container line" covers the organizational aspects of the pure line without taking into consideration any hardware

2) "Container ship" covers container ships or a fleet of container ships managed by one ship manager.

3) "Container Terminal" covers container terminals.

4) "Reefer Containers" covers the container fleet and the maintenance of it (including the relation to repair shops).

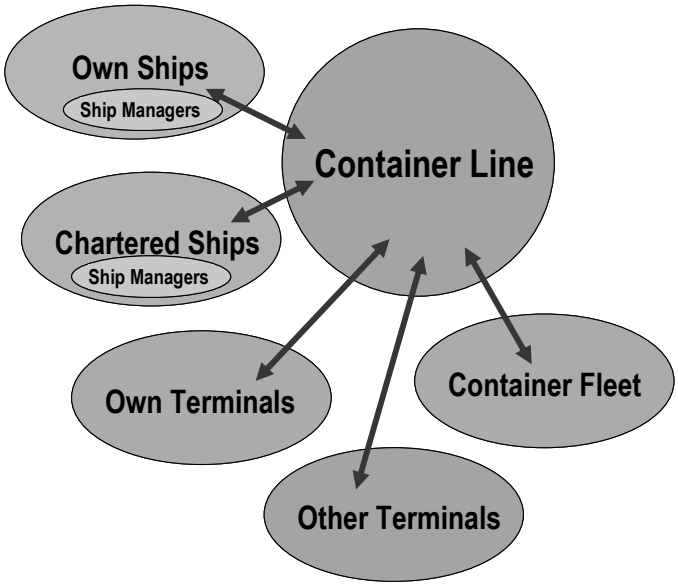

Figure 5: Systematic of the CCQIs for reefer container shipping

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For the hardware evaluation only own hardware will be taken into consideration. Therefore a container line that does not operate own vessels or terminals will not get the corresponding point values displayed in the CCQI certificate.

4.2.9.1 Container Line CCQI

This CCQI is used for the evaluation of the organizational aspects of a container line. A container line offers transport in own or long term leased reefer containers. Simply speaking, a container line can be identified if there is a container fleet with its name on it. The transport of the reefer containers may be carried out on own vessels or on vessels of other carriers.

The container line CCQI covers only organizational aspects like contract requirements for cool chain related services and advisory services to subcontractors.

All cool chain related hardware such as container ships, container terminals or the container fleet itself are evaluated by separate master tables (see below).

4.2.9.2 Container Ship CCQI

This CCQI is used for the evaluation of single container ships and a fleet hereof. The organizational aspects (part C) cover the organization of the single vessel while part D covers the vessel's hardware and its suitability to carry as many reefer containers as specified.

Companies in charge of the technical management of a single container ship or a container ship fleet may apply for a CCQI Certificate covering one or several ships or the complete fleet. The evaluation of several ships will be done by means of part B of this master table which comprises the average calculation the single ships. All ships taken into account for the fleet evaluation will be listed in the appendix to the CCQI Certificate by their name and their IMO number.

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4.2.9.3 Container Terminal CCQI

This CCQI is used for the evaluation of container terminals and their suitability to handle reefer containers. Organizational aspects are covered in part A, while in part B the terminal's hardware is evaluated.

4.2.9.4 Reefer Containers CCQI

This CCQI is used for the evaluation of a container fleet. Organizational aspects that apply for the whole fleet (e.g. maintenance and PTI policy) are covered in part A. Typically such a fleet consists of several series of containers with equal specification. For each series of containers the hardware is evaluated in part C of the table. The fleet average for all series of reefer containers will be calculated in the same way as for trucks (see above 4.2.2) or aircraft (see above 4.2.6).

4.2.10 CCQIs for Ocean Transport with Reefer Ships

In order to represent the special contractual relations within the shipping industry in a suitable way there is a total number of three CCQI master tables to cover the transport of PTSP (break-bulk and palletized) on conventional reefer ships (see also Fig. 6):

1) "Reefer ship line" covers the organizational aspects of the pure line without taking into consideration any hardware

2) "Reefer ship" covers reefer ships or a fleet of reefer ships managed by one ship manager.

3) "Sea Port Terminal" covers terminals used for the handling of goods that are transported by reefer ships.

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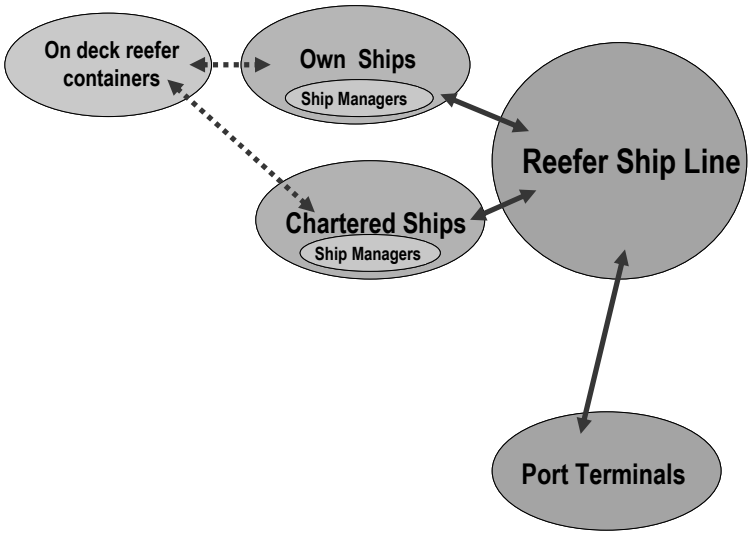

Figure 6: Systematic of the CCQIs for conventional reefer shipping

For the hardware evaluation only own hardware will be taken into consideration. Therefore a reefer ship line that does not operate own vessels will not get the corresponding point values displayed in the CCQI certificate.

4.2.10.1 Reefer Ship Line CCQI

This master table applies to reefer ship lines. The table is restricted to organizational issues including contractual agreements for the various cool chain related services such as own and/or chartered reefer ships and seaport terminals. All cool chain related hardware such as reefer ships or seaport terminals are evaluated by separate master tables (see below).

4.2.10.2 Reefer Ship CCQI

This master table applies to the individual evaluation of reefer ships. The evaluation includes organizational issues as well as technical installations and equipment.

Organizational issues are treated individually for each ship and are dealt with in part C of this master table. The evaluation of the technical installations and ships equipment are in any case ship specific, their evaluation shall be carried out by means of part D.

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Companies in charge of the technical management of a single reefer ship or a reefer ship fleet may apply for a CCQI Certificate covering one or several reefer ships or the complete fleet. The evaluation of several reefer ships will be done by means of part B of this master table which comprises the average calculation of single ships. All reefer ships taken into account for the fleet evaluation will be listed in the appendix to the CCQI Certificate by their name and their IMO number.

Reefer ships which are also designed for the carriage of integral reefer containers may additionally be evaluated by using the master table “Container Ship”.

4.2.10.3 Sea Port Terminal CCQI

This master table applies to the evaluation of sea port terminals used for the handling of goods that are transported by reefer ships. Typically these terminals handle palletized or break-bulk cargoes. The evaluation includes the three main topics organization (part A), hardware of the storage and handling facility (part B) and hardware of the refrigeration system (part C).

4.3 Calculation of Overall CCQI Points

The list of operations forms the basis for the calculation of overall CCQI points that will be included in the CCQI certificate. For this purpose, the CCQI points of all operations of one type of operation (e.g. Air transport) will be summed up over all locations and the sum is divided by the number of operations added (arithmetic average).

In this averaging procedure, only those operations matching or exceeding the benchmark as stated in section 6.1 will be taken into account.

The result is rounded to the next higher integer number. The individual usage or importance of single operations will not be taken into consideration.

For the example shown under item 4.1 the calculation of the overall CCQI points would look as follows:

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World Logistic Group

Overall CCQIs

Type of Operation	Overall CCQI
Truck & Trailer	76
Aircraft	71
Apron Handling	68
Short Term Storage	79

This example is fully fictive and does not show the operations of any real company.

Table 2: Example of Calculation of Overall CCQIs.

5 Cool Chain Quality Conformance Requirements

5.1 Policy

Top management shall ensure that a cool chain policy is established and known by all cool chain relevant employees, which

a. is appropriate to raise awareness, improve cool chain quality and maintain controlled temperature conditions,

b. includes a commitment for appropriate training of all cool chain related personnel,

c. includes a commitment for continuous improvement of the cool chain,

d. is reviewed at least during the annual management review process for continuing suitability.

5.2 Mandatory Practices / Control of Cool Chain Conditions

All requirements mentioned under this paragraph must be documented within the organization's internal manual and must be implemented by the organization. All items that are marked to be "on record" might be subject to verification during the external audit.

The organization itself shall demonstrate the following:

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1. The organization accepts PTSP only if documents are furnished which include temperature and/or temperature range instructions. The temperature and/or temperature range instructions must be on record. In case of reefer containers these instructions shall also include details on fresh air exchange.

2. The organization provides all subcontractors with the relevant temperature and/or temperature range instructions (cool order) for the handling of PTSP.

3. Acceptance points or steps shall be defined and documented.

4. At acceptance points the organization performs as a routine operation

   - temperature measurements[4] of the commodity and a comparison with prescribed conditions, unless
     - prohibited by law,
     - cargo is sealed, or
     - prohibited by practicability.

     and records them
   - a visual inspection of the packaging and check for damage and suitability, and
   - a check on all supplied documents for availability and completeness of required information.

   Deviations from prescribed conditions shall be reported to the Cool Chain Manager and be recorded.

[4] In case of palletized fresh products (fruit, vegetables, flowers etc.) temperature shall be measured, where practical, at the middle point at anyone side of the pallet, at least 5 cm into the package.

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5. The organization accepts dangerous PTSPs only if qualified relevant training has been carried out and appropriate equipment is available.

6. If dangerous goods are accepted they shall be stored in spaces separated from other PTSPs.

7. The organization accepts frozen PTSPs only if qualified cooling equipment is available.

8. The organization stores and segregates PTSPs as recommended by the organization's internal documents.

9. The organization provides a suitable training for staff involved in PTSP processes.

10. Equipment shall be clean and free from dust or odors prior to usage. Deviations shall lead to rejection of equipment and shall be recorded.

11. Warehouse temperature is recorded whilst PTSP are stored in short or long term storage.

12. Reefer container capacity of container ships shall be specified in terms of maximum number of reefer containers and type of cargoes.

5.3 Training

5.3.1 List of Cool Chain Related Personnel

The organization shall provide and maintain a list with the number of all its personnel related to the cool chain at its locations and operations. For each operation the list shall include the description of the operation, the type of operation, the geographical location and the number of personnel employed, subdivided by their duties.

The following table shows an example of such a list.

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List of Cool Chain related personnel				Organization		Truck & Trailer		Long Term Storage		Short Term Storage		Aircraft				Apron Handling	
No.	Description of operation / Company Name	Type of operation	Geographical Location	Cool Chain Manager	Management / Administration	Driver	Booking Clerk	Store Keeper	Workers / Drivers	Store Keeper	Workers / Drivers	Pilots	Load Master	Booking Clerk	Workers / Cargo Handlers	Supervisor	Workers / Drivers
1	World Logistic Deutschland GmbH: Trucking Services based at German Airports	Truck & Trailer	Germany	1	2	34	3										
2	World Logistic Netherlands BV: Trucking Services based at Dutch Airports	Truck & Trailer	Netherlands	1	2	22	2										
3	World Locistic France SA: Trucking Services based at French Airports	Truck & Trailer	France	0	1	12	2										
4	World Air Cargo Ltd.: Aviation Division	Aircraft	London	1	3							32	9	2	45		
5	WL Ground Services Deutschland GmbH: Transport to / from aircrafts at Frankfurt Airport	Apron Handling	Frankfurt	0	1											2	10
6	WL Ground Services Deutschland GmbH: Perishable Center at Frankfurt, Flughafenstrasse 23	Short Term Storage	Frankfurt	0	1					1	10						
7	WL Ground Services Netherlands BV: …	Apron Handling	Amsterdam	0	1											1	6
8	WL Perishables Netherlands BV: …	Short Term Storage	Amsterdam	0	1					1	7						
9	…	Apron Handling	Paris	0	1											1	4
10	…	Short Term Storage	Paris	0	1					1	4						
			Sum	3	14	68	7	0	0	3	21	32	9	2	45	4	20

This example is fully fictive and does not show the operation of any real company. **Total** **228**

Table 3: Example of List of Cool Chain Related Personnel.

5.3.2 Training Topics

Personnel performing work affecting cool chain quality shall be competent on the basis of appropriate education, training, skills and experience.

To start with a process to measure proficiency execution of important training will be awarded with points in the CCQI Master tables in Annex II.

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It is recommended that the organization

- determines the training needs and carries out the respective training for personnel performing work affecting cool chain quality. For guidance only, training topics as shown in ANNEX III can be taken into account.
- maintains appropriate records of training given

Training shall be commodity specific as well as organization and process related, i.e. an organization that only handles fruit and vegetables will not need to provide training on the handling of deep frozen commodities.

5.4 Responsibility and Authority

5.4.1 Cool Chain Manager

Top management shall appoint a member of management as “Cool Chain Manager” who, irrespective of other responsibility, shall have responsibility and authority that includes

a. ensuring that the Cool Chain Quality Indicators together with the Cool Chain Quality Management System are documented, established, implemented and maintained,

b. ensuring that internal audits are carried out on an annual basis,

c. reporting to top management at least prior to the management review in writing (record) on the performance of the cool chain related quality management system and any need for improvement, and

d. ensuring the promotion of cool chain related awareness and of cool chain customer requirements throughout the organization by appropriate measures including training.

5.4.2 Further Responsibilities and Authorities

Top management shall ensure that the cool chain related responsibilities and authorities for all cool chain relevant personnel are defined and communicated within the organization.

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5.5 Cool Chain Related Subcontractors and Suppliers

The organization shall select cool chain related subcontractors and suppliers based on their ability to supply adequate cool chain related services.

If a supplier or subcontractor holds a valid CCQI certificate no further measures are necessary.

For all other suppliers and subcontractors the special cool chain related requirements need to be formulated by the relevant management staff for each supplier and subcontractor and submitted to him in writing. Respective records need to be filed.

The responsibilities of the respective management shall contain the task to supervise the performance of all subcontractors and suppliers and a feed back on performance of subcontractors and suppliers needs to be given to top management as input (recorded) for the management review on an annual basis.

5.6 Claims, Non-Conformities and Customer Complaints

Cool Chain related claims, Non-Conformities and customer complaints shall be recorded.

Such events shall be analyzed to determine the respective causes and appropriate preventive action, to ensure that such events do not reoccur. Causes and preventive actions shall be recorded.

An analysis (record) of cool chain related claims, Non-Conformities and customer complaints shall be available for the top management as input to the management review.

5.7 Control of Documents

5.7.1 Documents

The cool chain related documented management system (documents) of an organization shall be controlled.

Documents shall be approved for adequacy prior to issue. Changes and the current revision status of documents shall be identified. Relevant versions of applicable documents shall be available at

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points of use. Documents shall remain legible and readily identifiable. It should be ensured that documents of external origin are identified and their distribution is controlled. Unintended use of obsolete documents shall be prevented by applying suitable identification to them, if they are retained for any purpose.

5.7.2 Records

Records are documents stating results achieved or providing evidence of activities performed. Records shall be established and maintained to provide evidence of conformity to requirements and of the effective operation of the cool chain quality management system. Records shall remain legible, readily identifiable and retrievable. A documented procedure shall be established to define the controls needed for the identification, storage, protection, retrieval and disposition of records.

The retention time for temperature records shall be at least 12 months, for all other records at least three years.

5.8 Internal Audits

The organization shall conduct internal audits on an annual basis prior to each management review in order to determine whether the Cool Chain Quality Management System conforms to the requirements of this Standard.

An audit program shall be planned, ensuring, that the headquarters and all locations, where cool chain related activities are carried out, are audited. Internal auditors shall be impartial and objective and shall not audit their own work. The results of previous internal and external audits shall be taken into account. The audit results shall be recorded.

The management responsible for the area being audited shall ensure that actions are taken without undue delay to eliminate detected Non-Conformities and their causes.

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5.9 Management Review

Top management shall review the organization's Cool Chain Quality Management System (CCQM) including the established Cool Chain Quality Indicators (CCQI) on a minimum annual basis prior to each external audit. The review shall include

- a report of the Cool Chain Manager containing results from
    - internal audits,
    - report on subcontractor and supplier performance,
    - an analysis of claims / Non-Conformities/ customer complaints and corresponding preventive action and
    - a report on the development of the Cool Chain Quality Indicators

  for headquarters and all locations to be certified.
- an assessment of opportunities for improvement and need for changes to the organization's policy and the Cool Chain Quality Management System.

The results of the management review shall be recorded.

6 Process of certification

6.1 Benchmarks

For certification the following minimum number of CCQI points per location and operation (see section 4.3) must be obtained or exceeded:

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Operation	CCQI Benchmark
Pre-cooling	65
Truck & Trailer Transport	60
Long Term Storage	60
Short Term Storage / Distribution Center	65
Retail Store	60
Air Transport	65
ULD Services	65
Apron Handling at Airport	55
Container Line	70
Container Ship	70
Container Terminal	70
Reefer Containers	70
Reefer Ship Line	75
Reefer Ship	60
Sea Port Terminal	70

Table 4: CCQI Benchmarks[5]

The successful pass of the benchmarks shall be checked during internal audits. Operations at locations not matching or exceeding the benchmarks stated above will not be displayed in the annex of the certificate and will not be taken into account for the computation of the overall CCQI points per operation.

6.2 External Audits

External Audits will be performed by Germanischer Lloyd Certification prior to certification and thereafter on an annual basis within a time window of +/- 3 months from the issuance date of the certificate.

The certification process is as follows:

[5] It has to be highlighted that the benchmarks of the different operations may not be compared against each other because each individual benchmark is derived from the contents of the respective master table. Master tables are tailor-made for each operation.

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1. Submit application for certification to GLC.
2. GLC nominates a Lead Auditor.
3. The Lead Auditor chooses locations to be audited and arranges audit details with the Cool Chain representative of the organization. The detailed audit plan will be established at the start of the audit on site.

During the audit Minor and Major Non-Conformities (if any) will be reported to the Cool Chain Manager.

A Minor Non-Conformity is a minor deviation from the requirements of this standard, which is not endangering the functioning of the organization's cool chains.

A Major Non-Conformity is a deviation from the requirements of this standard which represents a real threat to the functioning of the organization's cool chain. A lot of minor Non-Conformities could be transferred to one Major Non-Conformity.

Minor Non-Conformities shall be corrected within 3 months. If Minor Non-Conformities are still in existence at the time of the next audit they turn automatically into Major Non-Conformities.

Major Non-Conformities lead to non issuance respectively withdrawal of a CCQI Certificate with subsequent re-audit for reinstating the certificate.

The audits will be performed in the headquarters of the organization and on a sampling basis in the geographical locations of the organization in accordance with below mentioned table. Documentation evaluation will be performed on site during the first day of the audit.

An adequate number of hardware units and related staff need to be audited in the headquarters and in the locations chosen to be audited.

Audit results and Non-Conformities (if any) will be presented to the Cool Chain Manager during the audit and in writing to the top management at the end of the audit.

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number of cool chain employees[6]	up to 5	6 -20	21 -50	51 -100	101 -200	201 -500	501 -1000	1001 -2000	2001 -5000	5000 -10000
audit days[7]	1	1.5	2	2.5	3	4	5	6	7	8

Table 5: Audit days for organization (without further geographical locations)

number of locations[8]	1 -3	4 - 10	11 -20	21 -30	31 -50	51 -100	101 -200	201 -300	301 -400	401 -500
number of locations to be audited[9]	1	2	3	4	5	6	7	8	9	10
additional audit days on site	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5

Table 6: Audit days for further geographical locations

The above time table is set under the assumption that the organization is properly prepared for the audit including:

- All requirements of this standard are reflected in the documented management system of the organization. This document includes a cross reference table detailing the documentation references for the requirements of this standard.
- Internal audits in all cool chain related departments and in all cool chain related geographical locations have been performed checking all requirements of this standard and recording no Major Non-Conformity still in existence.
- All relevant CCQI Master Tables have been carefully and correctly filled in.
- Overall CCQI points per operation are properly calculated and recorded.
- Top management has performed the cool chain related management review.

[6] Cool chain related employees including management and administration in entire organisation incl. locations
[7] Audit days per year on site including document review
[8] Total number of locations with cool chain related activities as of section 4.1
[9] Geographical locations to be selected annually by the lead auditor from the list of operations to be certified.

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In case of improper preparation for the audit and /or Non-Conformities detected during the external audits the actual time spent for re-audits and additional administration will be added to the above mentioned table.

6.3 Certification

After a successful external audit a certificate showing the overall CCQI points (0 to 100) per operation is issued with validity commencing at the date of the last audit day for a period of 12 months.

After the annual external audit being successfully passed the certificate is renewed containing the actual new CCQI points at the time of the annual audit.

As an annex to the certificate the certified geographical locations and operations of the organization will be listed showing the CCQI points achieved.

7 Rights and Obligations of CCQI Certified Organizations

After successful certification an organization will be granted the right to use the CCQI certificate and logo for the time of the validity of the certificate. The certificate and the annex may be published or passed on to third parties in the form of copies.

The certificate is valid for twelve (12) months.

It is the obligation of a CCQI certified organization to maintain the Cool Chain Quality Management System and regularly update the CCQI master tables upon changes. A CCQI certified organization shall always ensure that CCQI benchmarks are met at all times.

It is the right of a CCQI certified organization to use the CCQI logo on letter heads, bills of lading and other forms in such a way that its entire contents is still legible.
The logo may not be used in a misleading way.

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Figure 7: CCQI logo

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Date: 2008-02-15

ANNEX I: Glossary

1. **Audit:** Systematic and documented process for obtaining evidence and evaluating it objectively to determine the extent to which audit criteria of this standard are fulfilled.
   Audits can be 1st party audits performed by the organization under evaluation of itself or 2nd party audits performed independently by Germanischer Lloyd Certification
2. **Acceptance Point:** Process or location in operation where cargo is accepted.
3. **Benchmark:** Established CCQI target to match or exceed in order to qualify for the CCQI Certificate.
4. **CCA:** Cool Chain Association.
5. **Conformity:** fulfillment of a requirement.
6. **Cool Chain Quality Indicator Standard:** Industry Standard for logistic operations involving PTSPs.
7. **Cool Chain Quality Indicator:** Quality measure of an operation within a Cool Chain indicating to the reliability and quality of that particular service of an organization.
8. **Cool Chain Quality Management System**: A system coordinating activities to direct and to control an organization with respect to Cool Chain quality.
9. **Cool Chain Related Personnel:** Personnel directly or indirectly involved in perishable logistics processes of the organization.
10. **Cool Chain Warehouse:** room equipped to suitably store PTSPs.
11. **Document:** information and its supporting medium.
12. **Documented Procedure:** a procedure that is coherently and comprehensibly documented.
13. **Equipment:** Cool Chain related hardware, installations or machinery.
14. **GLC:** the certification branch of Germanischer Lloyd group.
15. **Major Non-Conformity:** A sum of Minor Non-Conformities or non-fulfillments of requirements that seriously endanger the function of the Cool Chain.
16. **Non-Conformity:** non-fulfillment of a requirement
17. **Operation:** A Cool Chain Operation is a stage within the logistics process and is named after the particular type of operation such as
    - Truck & Trailer Transport,
    - Long Term Storage.
    - Short Term Storage / Distribution Center,
    - Aircraft Transport, or
    - Apron Handling at Airports,
18. **Organization:** CCA member organization applying for a CCQI certificate.
19. **Procedure:** A documented specified way to carry out an activity or a process.
20. **PTSP**: Perishables and Temperature Sensitive Products
21. **Record:** document stating results achieved or providing evidence of activities performed.
22. **Requirement:** need or expectation that is stated in this standard.
23. **Transport Equipment** means equipment used for the carriage of PTSP.
24. **ULD:** A **U**nit **L**oad **D**evice is a container used in air transport

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Version: 2.0
Date: 2008-02-15

ANNEX II: CCQI Master Tables

This Annex contains the documents:

II.1 Pre-cooling, Part A, B, C
II.2 Truck & Trailer Transport, Part A, B-1, B-2
II.3 Long Term Storage, Part A, B, C
II.4 Short Term Storage / Distribution Center, Part A, B, C
II.5 Retail Stores, Part A, B, C1 – C5
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II.8 Apron Handling at Airport, Part A, B
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II.9.4 Reefer Containers, Part A, B, C
II.10.1 Reefer Ship Line, Part A
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Annex II.1

Cool Chain Quality Indicator

CCQI Master Table

Pre-cooling

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Pre-cooling

Guidance for correct use and completion of this master table, see 4.2.1

ID-no.:	Name of location:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A Organization					
A.1 Instructions to personnel					
Dedicated instructions are available to personnel concerning					
- actions to be taken in case of breakdown of pre-cooling equipment	No: 0 Yes: 2	If the refrigeration equipment breaks down the pre-cooling process has to be re-started or continued after refrigeration is available again in order to reach the required pre-cooling temperature		2	
- actions to be taken in case of temperature deviations (prolongation of pre-cooling process)	No: 0 Yes: 2	If the required pre-cooling temperature is not reached after the minimum pre-cooling time the pre-cooling process has to be extended.		2	
- how to carry out temperature checks before and after pre-cooling	No: 0 Yes: 2	Different pre-cooling processes require different temperature measurement methods		2	
- transport from harvesting / producing / fishing / manufacturing / accepting to pre-cooling facility in order to reduce the time until start of pre-cooling	No: 0 Yes: 10	For most PTSP the time to reach optimum temperature is the most important factor for shelf-life		10	
			Σ (subtotal) A.1	**16**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.2 Capacity planning of pre-cooling equipment					
Is a detailed calculation of the pre-cooling capacity available taking into account different products and different product temperatures before and after pre-cooling?	No: 0 Yes: 8	The capacity calculation shall be on record. Typically this calculation is provided by the manufacturer of the pre-cooling equipment.		8	
Is a detailed prediction of the product supply to be pre-cooled available taking into consideration seasonal variations / peaks?	No: 0 Yes: 8	Prediction of the pre-cooling demand should be used to ensure that pre-cooling capacity is always sufficient to ensure proper pre-cooling.		8	
			Σ (subtotal) A.2	**16**	
A.3 Training for personnel involved in pre-cooling, storage and handling of perishables and temperature sensitive products (PTSP)					
Management provides no PTSP-related training	0	Training is particularly important to production managers. Training may be conducted by officially licensed organizations or by company internal trainers.		10	
Management provides training on PTSP related subjects occasionally	5				
Management provides PTSP related training according to a training plan including measures in case of insufficient pre-cooling result.	10				
A.4 Technical maintenance of pre-cooling equipment					
Maintenance / repair is conducted in case of malfunctions	0	Maintenance schedule shall include scope and interval of maintenance including records of maintenance and repairs done.		8	
Maintenance is conducted to pre-cooling equipment and associated refrigeration systems on the basis of planned maintenance schedule.	8				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.5 Hygienic maintenance					
Cleaning of pre-cooling equipment is conducted as deemed necessary by the operator Cleaning of pre-cooling equipment is based on procedures or contractual agreements on hygienic maintenance. Interval / scope and method of cleaning shall reflect the type of process and sensitiveness of product.	0 5	Hygienic maintenance is mainly related to the internal surfaces of the pre-cooling equipment including surfaces directly in contact with the product or exposed to the air flow such as evaporators and air ducting systems. Hygienic maintenance should be carried out on a regular basis.		5	
			Σ (subtotal) A	**55**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B. Pre-cooling facility					
B.1 Spaces for packaging / commissioning / repacking					
Spaces used for packaging / commissioning / repacking are		Temperature deviations must be avoided during packaging, commissioning and repacking.		10	
- not temperature controlled	0				
- temperature controlled	10				
B.2 Arrangements to protect cargoes during handling					
Loading operations of pre-cooled products are carried out via		Pre-cooled products should be protected from unfavorable ambient conditions during loading on trucks or rail wagons.		5	
- open ramp	0				
- dock shelters	5				
B.3 Forklift operation					
Forklifts used within the storage / handling facility are		Contamination of PTSP by exhaust gas shall be avoided. If no forklifts are used the maximum number of points may be granted.		5	
- gas/diesel-driven without suitable exhaust gas filters	0				
- electric-driven or manually operated or gas/diesel-driven with suitable and certified exhaust gas filters / catalysators	5				
			Σ (subtotal) B	**20**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C Facility's equipment					
C.1 Availability of cold rooms					
Does the pre-cooling facility provide cold room(s) for the storage of pre-cooled products?	No: 0 Yes: 10	Even if pre-cooled products are immediately loaded for transport, cold rooms for the storage of these products are needed in order to provide buffering capacity to compensate delays. If cold rooms are available it is recommended to evaluate them using the CCQI master tables for short - or long term storage.		10	
C.2 Temperature recording					
Core temperatures of pre-cooled products are measured		Core temperatures have to be measured in all cases in order to qualify for certification. Manual measurements are considered less reliable due to human factor. Automatic temperature measurement ensures continuous quality of pre-cooling process. Automatic recording enables proper documentation / traceability.		10	
- manually after pre-cooling process	0				
- automatic and continuous measurement of - product end temperature, or - cooling down process including product end temperature	8				
- automatic and continuous measurement of - product end temperature, or - cooling down process including product end temperature including automatic recording of temperatures	10				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C.3 Alarm system for pre-cooling equipment					
In case of a malfunction or breakdown of the pre-cooling system - no alarm is activated - on-site alarm is activated	 0 5	Fast detection of a malfunction of the pre-cooling equipment enables the operator to initiate appropriate emergency action in order to prevent damage to the products.		5	
			Σ (subtotal) C	**25**	
			Σ (total) A+B+C	**100**	

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Annex II.2

Cool Chain Quality Indicator

CCQI Master Table

Truck & Trailer Transport

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Truck & Trailer Transport

Guidance for correct use and completion of this master table, see 4.2.2

ID no.:	Operation / Location:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Instructions and equipment for drivers					
Dedicated instructions are available to drivers concerning:		Instructions may be individual or part of the "Driver's Manual".			
- transport of perishables and temperature sensitive products (PTSP)	No: 0 Yes: 2	Instructions should include compatibility of PTSP.		2	
- loading and unloading of PTSP	No: 0 Yes: 2	Instructions for temperature checks allow the temperature readings to be analyzed later on, i.e. locations for measurements need to be defined.		2	
- temperature checks during transport and loading operations	No: 0 Yes: 2			2	
Drivers are equipped with a temperature measurement probe suitable to check cargo temperature before loading	No: 0 Yes: 6	No temperature checks possible without suitable probes.		6	
			Σ (subtotal) A1	**12**	
A.2 Route optimization					
Vehicles are equipped with tracking devices for route optimization	2	Use of tracking devices might shorten transport time.		2	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.3 Actions taken after breakdown					
In case of breakdown of vehicle engine or cooling appliance, cargo care depends on driver's decision / experience.	0	Emergency response plan shall include procedures covering – malfunction of cooling appliance – malfunction of vehicle engine – traffic congestions or other delays – detection of cargo damage with the aim to minimize damage to the cargo		10	
Contact person for emergency response assistance is available by phone / radio during operating hours.	5				
In case of breakdown of vehicle engine or cooling appliance, cargo care will be initiated according to an emergency response plan.	10				
A.4 Training for truck drivers involved in transport of perishables and temperature sensitive products (PTSP)					
Management provides no PTSP-related training	0	Training is particularly important to truck drivers. Training may be conducted by officially licensed organizations or by company internal trainers.		8	
Management provides training on PTSP related subjects occasionally	4				
Management provides PTSP related training according to a training plan including measures for emergency situations	8				
A.5 Technical maintenance of vehicles (truck & trailers)					
Maintenance / repairs are generally conducted to vehicles upon breakdown.	0	Maintenance schedule shall include scope and interval of maintenance including records of maintenance and repairs done.		2	
Maintenance is conducted to vehicles on the basis of planned maintenance schedule.	2				
A.6 Technical maintenance of cooling appliances					
Maintenance / repairs are generally conducted to cooling appliances upon breakdown.	0	Maintenance schedule shall include scope and interval of maintenance including records of maintenance and repairs done.		3	
Maintenance is conducted to cooling appliances on basis of planned maintenance schedule.	3				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.7 Hygienic maintenance					
Cleaning of vehicles is conducted as deemed necessary by the driver.	0	Hygienic maintenance is mainly related to the internal surfaces of the vehicle body including surfaces exposed to the air flow such as evaporators and air ducting systems, and should be carried out on a regular basis.		3	
Cleaning of vehicles is based on procedures or contractual agreements on hygienic maintenance.	3				
			Σ (subtotal) A	**40**	

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
B. Transport equipment / Vehicles						
Points according to separate tables B1 (long distance) or B2 (local distribution) for each type / model of truck or trailer			**Number of vehicles of same type / model**		**Points**	
# 1	Long Distance Vehicle Type #1		n_1		60	
# 2	Long Distance Vehicle Type #2		n_2		60	
…	…		…		60	
# n	Long Distance Vehicle Type #n		n_n		60	
# n+1	Local Distribution Vehicle Type #1		n_{n+1}		60	
…	…		…		60	
# n+2	Local Distribution Vehicle Type #2		n_{n+2}		60	
# n+i	Local Distribution Vehicle Type #i		n_{n+i}		60	
Average of truck & trailer fleet			**n+i**		**60**	
			Σ (subtotal) B		**60**	
			Σ (total) A+B		**100**	

Cool Chain Quality Indicator (CCQI) for Truck & Trailer Transport - Long Distance Vehicles

Guidance for correct use and completion of this master table, see 4.2.2

Vehicle no.:	Vehicle model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
B1 Transport equipment used for long distance and / or international transportation Long distance transportation is defined as transport with normally only one loading and one unloading point					
B1.1 Classification of vehicle insulation					
Transport equipment is only partly or non insulated.	0	Certification in line with ATP or equivalent includes testing of insulation (k-value) of one vehicle of same type and re-testing of in-service vehicles after 6, 9 and 12 years, thus adequate vehicle insulation is verified. For each vehicle an ATP Certificate or equivalent is available.		24	
Transport equipment is fully insulated, however capacity of insulation (k-value) is unknown or stated by manufacturer only.	15				
Transport equipment is fully insulated, capacity of insulation (k-value) is certified by accredited third party when new.	20				
Transport equipment is fully insulated, capacity of insulation (k-value) is certified by accredited third party including regular re-inspections of each vehicle, e.g. according to ATP or equivalent.	24				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B1.2 Cooling appliance					
Vehicle is not equipped with a cooling appliance.	0	Cargo will warm up. Inside temperature is uncontrolled and depends on ambient conditions and time.		24	
Vehicle is equipped with an eutectic system or a liquefied gas system.	12	Operating range of vehicle is limited by time and ambient temperatures.			
Vehicle is equipped with a mechanical refrigeration unit, net cooling capacity is not certified.	20	Cooling capacity is not known. Compressor may be driven by vehicle engine or by an independent diesel engine.			
Vehicle is equipped with a self-sustained mechanical refrigeration unit, net cooling capacity is certified by accredited third party, e.g. according to ATP or equivalent.	24	Availability of sufficient cooling capacity is ensured. The compressor drive needs to be independent from the vehicle engine, e.g. driven by own diesel engine.			
B1.3 Vehicle accessories					
Vehicle is equipped with means for air renewal.	No: 0 Yes: 2	In case of carriage of fruit and vegetables, renewal of air prevents accumulation of ripening gas.		2	
Vehicle with internal body length > 6 m is equipped with an air ducting system.	No: 0 Yes: 3 N.A.: 3	Air ducts for air circulation provide a consistent temperature distribution. not applicable (N.A.) if body length < 6m.		3	
			Σ (subtotal) B1.3	**5**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B1.4 Temperature monitoring / recording					
Vehicle without permanent thermometer or temperature recorder	0	Monitoring of temperature condition is not possible.			
Vehicle is equipped with a thermometer.	1	Thermometer allows only manual temperature readings.			
Vehicle is equipped with a temperature recorder.	5	Temperature recorders provide documentation of the temperature history.		7	
Vehicle is equipped with a temperature recorder and automatic data transfer to a central office.	7	Automatic data transfer to a central office ensures quick response and decisions to be taken by responsible management in case of malfunctions.			
			Σ (subtotal) B1	**60**	

Cool Chain Quality Indicator (CCQI) for Truck & Trailer Transport - Local Distribution Vehicles

Guidance for correct use and completion of this master table, see 4.2.2

Vehicle no.:	Vehicle model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
B2 Transport equipment used for local distribution Local distribution is defined as transport with several loading and unloading points					
B2.1 Classification of vehicle insulation					
Transport equipment is only partly or non insulated.	0	Certification in line with ATP or equivalent includes testing of insulation (k-value) of one vehicle of same type and re-testing of in-service vehicles after 6, 9 and 12 years, thus adequate vehicle insulation is verified. For each vehicle an ATP Certificate or equivalent is available.		25	
Transport equipment is fully insulated, however capacity of insulation (k-value) is unknown or stated by manufacturer only.	15				
Transport equipment is fully insulated, capacity of insulation (k-value) is certified by accredited third party when new.	20				
Transport equipment is fully insulated, capacity of insulation (k-value) is certified by accredited third party including regular re-inspections of each vehicle, e.g. according to ATP or equivalent.	25				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B2.2 Cooling appliance					
Vehicle is not equipped with cooling appliance.	0	Cargo will warm up. Inside temperature is uncontrolled and depends on ambient conditions and time.			
Vehicle is equipped with an eutectic system, a liquefied gas system or with a mechanical refrigeration unit, net cooling capacity is not certified.	15	Cooling capacity is not known. Availability of refrigeration might be limited. Compressor may be driven by vehicle engine or by an independent diesel engine.		20	
Vehicle is equipped with a self-sustained mechanical refrigeration unit, net cooling capacity is certified by accredited third party, e.g. according to ATP or equivalent.	20	Availability of sufficient cooling capacity is ensured. The compressor drive needs to be independent from the vehicle engine, e.g. driven by own diesel engine.			
B2.3 Vehicle accessories					
Vehicle is equipped with separating bulkhead(s).	No: 0 Yes: 2	Separation of cargo prevents cross contamination. Vehicle can be used for different commodities carried in different temperature zones.		2	
Vehicle is equipped with door curtains to prevent temperature loss during loading / unloading.	No: 0 Yes: 4 N.A.: 4	Door curtains are accounted for only when vehicle is designed for temperatures < 0°C. not applicable (N.A.) when vehicle is designed only for temperatures > 0°C.		4	
Vehicle with internal body length > 6 m is equipped with an air ducting system.	No: 0 Yes: 4 N.A.: 4	Air ducts for air circulation provide a consistent temperature distribution. not applicable (N.A.) if body length < 6m.		4	
			Σ (subtotal) B2.3	**10**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B2.4 Temperature monitoring / recording					
Vehicle without permanent thermometer or temperature recorder	0	Monitoring of temperature condition is not possible.		5	
Vehicle is equipped with a thermometer.	1	Thermometer allows only manual temperature readings.			
Vehicle is equipped with a temperature recorder.	5	Temperature recorders provide documentation of the temperature history.			
			Σ (subtotal) B2	**60**	

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Annex II.3

Cool Chain Quality Indicator

CCQI Master Table

Long Term Storage

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Long Term Storage

Guidance for correct use and completion of this master table, see 4.2.3

ID no.:	Operation / Location:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Instructions and equipment for store keepers					
Dedicated instructions are available to store keepers concerning:					
- handling and storage of perishables and temperature sensitive products (PTSP)	No: 0 Yes: 2	Instructions should include compatibility of PTSP.		2	
- compatibility of PTSP concerning cross-contamination	No: 0 Yes: 2	Instructions for temperature checks allow the temperature readings to be analyzed later on, i.e. locations for measurements need to be defined.		2	
- temperature checks on acceptance of PTSP	No: 0 Yes: 2			2	
Store keeper is equipped with a temperature measurement probe suitable to check cargo temperature on acceptance	No: 0 Yes: 6	No temperature checks possible without suitable probes.		6	
			Σ (subtotal) A1	**12**	
A.2 Store Keeping					
Registration and control of in- and outgoing goods and traceability within the store including control of shelf life.					
- no registration of stored goods	0	Use of electronic database protects goods from excessive storage or being lost in storage.		6	
- manual registration of in- and outgoing goods and stowage position e.g. log book	4				
- electronic database of in- and outgoing goods and stowage position including shelf life information	6				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.3 Actions taken after refrigerant leakage or machinery breakdown					
In case of breakdown of refrigeration machinery or refrigerant leak, preventive action depends on store keeper's decision / experience	0	Emergency response plan shall include procedures covering – malfunction of cooling appliance – breakdown of electric power supply – refrigerant leaks – detection of cargo damage with the aim to minimize damage to the cargo		5	
Contact person for emergency response assistance is available by phone / radio during operating hours.	3				
In case of breakdown of refrigeration machinery or refrigerant leak preventive action will be initiated according to an emergency response plan	5				
A.4 Training for cold store personnel involved in storage and handling of perishables and temperature sensitive products (PTSP)					
Management provides no PTSP-related training	0	Training is particularly important to store keepers. Training may be conducted by officially licensed organizations or by company internal trainers. Training to be conducted in line with the emergency response plans.		8	
Management provides training on PTSP related subjects occasionally	4				
Management provides PTSP related training according to a training plan including measures for emergency situations	8				
A.5 Technical maintenance of refrigerating installations and insulation					
Maintenance / repair is conducted in case of malfunctions	0	Maintenance schedule shall include scope and interval of maintenance including records of maintenance and repairs done.		8	
Maintenance is conducted to refrigerating installations on the basis of planned maintenance schedule.	8				
A.6 Hygienic maintenance					
Cleaning of cold store is conducted as deemed necessary by the store keeper.	0	Hygienic maintenance is mainly related to the internal surfaces of the cold store including surfaces exposed to the air flow such as evaporators and air ducting systems, and should be carried out on a regular basis.		6	
Cleaning of cold store is based on procedures or contractual agreements on hygienic maintenance. Interval / scope and method of cleaning shall reflect type of storage and commodity.	6				
			Σ (subtotal) A	**45**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B. Storage facility					
B.1 Insulation of refrigerated spaces					
Insulation is		Full insulation of refrigerated spaces is the dominant factor to prevent heat ingress and protection of stored goods. Insulation properties generally deteriorate with age and absorption of moisture.		4	
- aged (> 10 years)	0				
- new (< 10 years) without internal and external cladding	2				
- new (< 10 years) with internal and external cladding	4				
B.2 Spaces for commissioning / repacking					
Spaces used for commissioning / repacking are		Temperature deviations must be avoided during commissioning and repacking.		4	
- not temperature controlled	0				
- temperature controlled	4				
B.3 Arrangements to protect cargoes during handling					
Access doors to storage rooms are		Heat loss from cold store should be prevented during door openings.		3	
- without additional means to prevent heat loss	0				
- automated and of quick acting type or equipped with door curtain or equivalent	3				
Loading / unloading operations are carried out via		Goods should be protected from ambient temperature conditions during loading of trucks or rail wagons.		4	
- open ramp	0				
- dock shelters	4				
			Σ (subtotal) B3	**7**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.4 Forklift operation					
Forklifts used within the storage / handling facility are					
- gas/diesel-driven without suitable exhaust gas filters	0	Contamination of PTSP by exhaust gas shall be avoided.		5	
- electric-driven or manually operated or gas/diesel-driven with suitable and certified exhaust gas filters / catalysators	5				
			Σ (subtotal) B	**20**	

C. Refrigeration System					
C.1 Redundant power supply					
Power supply for refrigeration machinery is by					
- one power line.	0	Electrical power supply is needed for the operation of the refrigeration machinery. Power supply could fail due to construction works or breakdown of energy supply.		6	
- at least two power lines	3				
- means of additional generator	6				
C.2 Type of refrigerant and refrigeration system					
- NH_3 (ammonia, R717) - Direct expansion	0	Depending on the type of refrigerant and the secondary cooling medium the goods may be subject to contamination by refrigerant gas in case of a leakage		4	
- NH_3 (ammonia, R717) - CO2 secondary system	1				
- NH_3 (ammonia, R717) - Indirect expansion (e.g. brine system)	2				
- Safety refrigerant (e.g. R134a, R404A, R22) - direct expansion	3				
- Safety refrigerant (e.g. R134a, R404A, R22) - indirect system (brine system)	4				

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
C.3	**Location of components containing refrigerant**					
-	Ammonia system with valves and fittings inside cold room	0	Pipe, valves and fittings are potential leak sources. The nearer the potential leaks are in relation to the stored goods the higher the potential for contamination will be.		4	
-	Ammonia system with valves and fittings outside cold room, but within adjacent spaces	2				
-	Ammonia system with valves and fittings in open air (e.g. on roof) outside of cold rooms	4				
-	All other refrigerants in any arrangement	4				
C.4	**Arrangement of refrigeration machinery room**					
-	Ammonia system with direct connection between reefer machinery room and cold room	0	The reefer machinery room is the location with the highest potential for large scale leaks. Direct connection means doors, unsealed pipe penetrations, ventilations duct etc.		4	
-	Ammonia system where machinery room is adjacent to cold room, but without direct connection	2				
-	Ammonia system where machinery room is far away from cold room	4				
-	All other refrigerants in any arrangement	4				
C.5	**Alarm system of refrigeration system**					
In case of malfunctions or breakdown of electricity						
-	no alarm is activated	0	Fast detection of a malfunction enables the operator to initiate appropriate emergency action in order to prevent damage to the goods.		5	
-	on-site alarm is activated, but not necessarily detected	3				
-	alarm to permanently manned operation central or remote alarm (telephone / SMS)	5				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C.6 Alarm system for cold rooms					
In case of temperature deviations		Fast detection of a temperature deviation enables the operator to initiate appropriate emergency action in order to prevent damage to the goods.		5	
- no alarm is activated	0				
- on-site alarm is activated, but not necessarily detected	3				
- alarm to permanently manned operation central or remote alarm (telephone / SMS)	5				
C.7 Temperature recording					
Temperatures in refrigerated rooms are		Temperature recorders provide the best documentation of the temperature history. If thermometers are used manual recording is required at regular intervals.		7	
- not checked by using measurement devices	0				
- checked by handheld thermometer	1				
- monitored with fixed mounted thermometers	2				
- documented with temperature recorders	5				
- documented with a temperature recorder and automatic data transfer to a central office	7				
			Σ (subtotal) C	**35**	
			Σ (total) A+B+C	**100**	

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Annex II.4

Cool Chain Quality Indicator

CCQI Master Table

Short Term Storage / Distribution Center

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Short Term Storage / Distribution Center

Guidance for correct use and completion of this master table, see 4.2.4

ID no.:		Operation / Location:			
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Instructions and equipment for store keepers					
Dedicated instructions are available to store keepers concerning:					
- handling and storage of perishables and temperature sensitive products (PTSP)	No: 0 Yes: 2	Instructions should include compatibility of PTSP.		2	
- compatibility of PTSP concerning cross-contamination	No: 0 Yes: 2	Instructions for temperature checks allow the temperature readings to be analysed later on, i.e. locations for measurements need to be defined.		2	
- temperature checks on acceptance of PTSP	No: 0 Yes: 2			2	
Store keeper is equipped with a temperature measurement probe suitable to check cargo temperature on acceptance	No: 0 Yes: 6	No temperature checks possible without suitable probes.		6	
			Σ (subtotal) A1	**12**	
A.2 Availability of services					
Services are available		Opening hours of the facility should cover the actual demand of incoming and outgoing goods. Waiting times due to closed storage and handling facilities shall be avoided.		4	
- from time to time	0				
- during normal office hours.	2				
- as needed including acceptance of delayed deliveries.	4				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.3 Actions taken after refrigerant leakage or machinery breakdown					
In case of breakdown of refrigeration machinery or refrigerant leak, preventive action depends on store keeper's decision / experience	0	Emergency response plan shall include procedures covering – malfunction of cooling appliance – breakdown of electric power supply – refrigerant leaks – detection of cargo damage with the aim to minimize damage to the cargo		6	
Contact person for emergeny response assistance is available by phone / radio during operating hours.	3				
In case of breakdown of refrigeration machinery or refrigerant leak preventive action will be initiated according to an emergency response plan	6				
A.4 Training for cold store personnel involved in storage and handling of perishables and temperature sensitive products (PTSP)					
Management provides no PTSP-related training	0	Training is particularly important to store keepers.Training may be conducted by officially licensed organisations or by company internal trainers.Training to be conducted in line with the emergency response plans.		8	
Management provides training on PTSP related subjects occasionally	4				
Management provides PTSP related training according to a training plan including measures for emergency situations	8				
A.5 Technical maintenance of refrigerating installations and insulation					
Maintenance / repair is conducted in case of malfunctions	0	Maintenance schedule shall include scope and interval of maintenance including records of maintenance and repairs done.		6	
Maintenance is conducted to refrigerating installations on the basis of planned maintenance schedule.	6				
A.6 Hygienic maintenance					
Cleaning of cold store is conducted as deemed necessary by the store keeper.	0	Hygienic maintenance is mainly related to the internal surfaces of the cold store including surfaces exposed to the air flow such as evaporators and air ducting systems, and should be carried out on a regular basis.		4	
Cleaning of cold store is based on procedures or contractual agreements on hygienic maintenance. Interval / scope and method of cleaning shall reflect type of storage and commodity.	4				
			Σ (subtotal) A	**40**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B. Storage and handling facility					
B.1 Temperature zones for storage of goods					
Temperature controlled storage rooms for the following temperature ranges are available:					
+18 … +22 °C	No: 0 Yes: 3	All commodities should be stored at their preferred temperature ranges. If facility handles only commodities of available storage temperature ranges, the maximum number of points (12) may be awarded.		3	
+10 … +15 °C	No: 0 Yes: 3			3	
+0 … +4 °C	No: 0 Yes: 3			3	
< -18 °C	No: 0 Yes: 3			3	
			Σ (subtotal) B1	**12**	
B.2 Special equipment for storage and handling					
In case that non-compatible commodities are handled within the same facility: Can they be stored / handled separately?		To prevent cross-contamination - foodstuffs for human consumption - foodstuffs for non-human consumption - dangerous goods - pharmaceuticals shall be treated separately.		2	
- No	0				
- Yes	2				
- not applicable	2				
In case that non-compatible fruit and vegetables are handled within the same facility: Can cross-contamination by ethylene be avoided?		Cross-contamination of non-compatible fruit and vegetable (e.g. apples and kiwis) by ethylene gas can be avoided either by - storing the products separately - intensive fresh air ventilation - ethylene absorption		2	
- No	0				
- Yes	2				
- not applicable	2				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
In case that iced products are handled: Can re-icing be carried out when required? - No - Yes - not applicable	 0 2 2	If products or packages are handled that require re-icing, this has to be carried out at the facility without delay.		2	
			Σ (subtotal) B2	6	
B.3 Spaces for commissioning / repacking					
Spaces used for commissioning / repacking are - not temperature controlled - temperature controlled	 0 10	Temperature deviations must be avoided during commisioning and repacking.		10	
B.4 Arrangements to protect cargoes during handling					
Access doors to storage rooms are - without additional means to prevent heat loss - automated and of quick acting type or equipped with door curtain	 0 2	Heat loss from cold store should be prevented during door openings.		2	
Loading / unloading operations are carried out via - open ramp - dock shelters	 0 2	Goods should be protected from ambient temperature conditions during loading of trucks or rail waggons.		2	
			Σ (subtotal) B4	4	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.5 Forklift operation					
Forklifts used within the storage / handling facility are					
- gas/diesel-driven without suitable exhaust gas filters	0	Contamination of PTSP by exhaust gas shall be avoided.		4	
- electric-driven or manually operated or gas/diesel-driven with suitable and certified exhaust gas filters / catalysators	4				
			Σ (subtotal) B	**36**	
C. Refrigeration System					
C.1 Redundant power supply					
Power supply for refrigeration machinery is by					
- one power line.	0	Electrical power supply is needed for the operation of the refrigeration machinery. Power supply could fail due to construction works or breakdown of energy supply.		4	
- at least two power lines	2				
- means of additional generator	4				
C.2 Type of refrigerant and refrigeration system					
- NH_3 (ammonia, R717) - Direct expansion	0	Depending on the type of refrigerant and the secondary cooling medium the goods may be subject to contamination by refrigerant gas in case of a leakage		4	
- NH_3 (ammonia, R717) - CO2 secondary system	1				
- NH_3 (ammonia, R717) - Indirect expansion (e.g. brine system)	2				
- Safety refrigerant (e.g. R134a, R404A, R22) - direct expansion	3				
- Safety refrigerant (e.g. R134a, R404A, R22) - indirect system (brine system)	4				

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
C.3	**Location of components containing refrigerant**					
-	Ammonia system with valves and fittings inside cold room	0	Pipe, valves and fittings are potential leak sources. The nearer the potential leaks are in relation to the stored goods the higher the potential for contamination will be.		2	
-	Ammonia system with valves and fittings outside cold room, but within adjacent spaces	1				
-	Ammonia system with valves and fittings in open air (e.g. on roof) outside of cold rooms	2				
-	All other refrigerants in any arrangement	2				
C.4	**Arrangement of refrigeration machinery room**					
-	Ammonia system with direct connection between reefer machinery room and cold room	0	The reefer machinery room is the location with the highest potential for large scale leaks. Direct connection means doors, unsealed pipe penetrations, ventilations duct etc.		2	
-	Ammonia system where machinery room is adjacent to cold room, but without direct connection	1				
-	Ammonia system where machinery room is far away from cold room	2				
-	All other refrigerants in any arrangement	2				
C.5	**Alarm system of refrigeration system**					
In case of malfunctions or breakdown of electricity			Fast detection of a malfunction enables the operator to initiate appropriate emergency action in order to prevent damage to the goods.		2	
-	no alarm is activated	0				
-	on-site alarm is activated	2				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C.6 Alarm system for cold rooms					
In case of temperature deviations		Fast detection of a temperature deviation enables the operator to initiate appropriate emergency action in order to prevent damage to the goods.		2	
- no alarm is activated	0				
- on-site alarm is activated	2				
C.7 Temperature recording					
Temperatures in refrigerated rooms are		Temperature recorders provide the best documentation of the temperature history. If thermoters are used manual recording is required at regular intervals.		8	
- not checked by using measurement devices	0				
- checked by handheld thermometer	2				
- monitored with fixed mounted thermometers	4				
- documented with temperature recorders	8				
			Σ (subtotal) C	**24**	
			Σ (total) A+B+C	**100**	

Annex II.5

Cool Chain Quality Indicator

CCQI Master Table

Retail Stores

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Retail Stores

Guidance for correct use and completion of this master table, see 4.2.5

ID no.:	Location of Retail Store:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Instructions and equipment					
Dedicated instructions are available to personnel involved in the handling of perishables concerning:					
- handling and storage of perishables and temperature sensitive products	No: 0 Yes: 2	Instructions should include temperature ranges for different products and compatibility of perishables.		2	
- compatibility of perishables concerning cross-contamination	No: 0 Yes: 1			1	
- temperature checks on acceptance of refrigerated products	No: 0 Yes: 2	Instructions shall include how and to what extend temperature checks upon acceptance are carried out (e.g. one pulp temperature per vehicle, one surface temperature per dolly; may be different depending on commodity and mode of delivery, e.g. company own deliveries or third parties deliveries.		2	
Temperature measurement equipment is available for					
- Pulp temperature measurements	No: 0 Yes: 1	Handheld temperature measurement devices are needed to enable the personnel to carry out temperature checks.		1	
- Infrared surface temperature measurements	No: 0 Yes: 1			1	
			Σ (subtotal) A1	7	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.2 Training for personnel involved in handling of perishables					
Training of permanent employed personnel		Training should include: - Hygienic requirements for foodstuffs - Stacking of goods in refrigerated display cabinets in order to ensure correct airflow - Load limits - Consideration of FIFO/FEFO[1] principle / best before date - Usage of night covers for display cabinets - Compatibility of commodities - Manual temperature readings of refrigerated display cabinets		4	
- Management provides no perishables related training	0				
- Management provides training on perishables related subjects occasionally	1				
- Management provides perishables related training according to a training plan including measures for emergency situations (see A.3)	4				
Training of temporary employed personnel				3	
- Management provides no perishables related training	0				
- Management provides training on perishables related subjects occasionally (e.g. upon start of temporary employment)	1				
- Management provides perishables related training according to a training plan including measures for emergency situations (see A.3)	3				
		[1]: FIFO: **F**irst **I**n **F**irst **O**ut FEFO: **F**irst **E**xpiring **F**irst **O**ut	**Σ (subtotal) A2**	7	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.3 Emergency Plans					
Emergency plans / handling instruction should be available for the following cases:					
- Temperature deviations at acceptance	No: 0 Yes: 1	Emergency plans / handling instructions should be available for typical temperature deviations or potential causes thereof. (If no A/C system is installed the maximum number of points will be awarded)		1	
- Temperature deviations of refrigerated cabinets and malfunction of refrigeration system	No: 0 Yes: 1			1	
- Malfunction of A/C system (if applicable)	No: 0 Yes: 1			1	
			Σ (subtotal) A3	3	
A.4 Technical Maintenance					
Refrigerated display cabinets:					
- Maintenance / Repairs are carried out in case of malfunctions	0	Technical maintenance should be carried out according to a planned maintenance schedule		1	
- Maintenance is conducted on the basis of a planned maintenance schedule	1				
Refrigeration system					
- Maintenance / Repairs are carried out in case of malfunctions	0	Technical maintenance should be carried out according to a planned maintenance schedule		1	
- Maintenance is conducted on the basis of a planned maintenance schedule	1				
Air conditioning					
- Maintenance / Repairs are carried out in case of malfunctions	0	Technical maintenance should be carried out according to a planned maintenance schedule		1	
- Maintenance is conducted on the basis of a planned maintenance schedule	1				
			Σ (subtotal) A4	3	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.5 Hygienic Maintenance					
Cleaning instructions for internal parts of display cabinets (air coolers, air ducts, fans, etc.) are available	No: 0 Yes: 3	Cleaning instruction should include cleaning schedules for refrigerated display cabinets (should be different depending on type of cabinet and commodity).		3	
A.6 FIFO/FEFO management / Waste log					
Is there a waste log in which all disposed perishables are recorded?		A waste log should be available in order to verify the correct application of the FIFO/FEFO principle and to demonstrate improvements of the loss rates.		7	
- No.	0				
- Yes, for packed perishables only.	3				
- Yes, for unpacked perishables only.	3				
- Yes, for all perishables.	7				
			Σ (subtotal) A	**30**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B. Store equipment					
B.1 Air conditioning (A/C)					
Air conditioning of perishables sales room - No A/C - Only temperature control - Temperature and humidity control	 0 3 4	Ambient conditions in the sales rooms are of paramount importance for the correct operation of open refrigerated display cabinets. Therefore A/C systems are important for keeping ambient condition within the desired range.		4	
Air conditioning of unloading and storage area - No A/C - Temperature control	 0 2	The unloading and storage area incl. dock shelter should be air conditioned in order to prevent goods from extreme temperatures during unloading of vehicles and waiting times within the back store area.		2	
			Σ (subtotal) B1	6	
B.2 Monitoring and recording of sales room temperatures					
No monitoring and recording of sales room temperatures Local monitoring (e.g. thermometer) of ambient temperatures near refrigerated cabinets Remote monitoring of ambient temperatures near refrigerated cabinets Remote monitoring and recording of ambient temperatures near refrigerated cabinets	0 1 1.5 2	To verify sufficient capacity of air condition system during summer time and correct operating conditions for refrigerated cabinets		2	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.3 Access doors					
Public access doors to the store		Ingress of warm moist air should be reduced to minimum in order to provide correct ambient conditions especially for open refrigerated display cabinets.		1	
- Manual doors without forced closing device	0				
- Semi-automatic doors (incl. forced closing device) or air lock or internal overpressure or door curtains	1				
Access doors from sales room to back store area		Mechanical damage to goods is reduced if automatic doors are used. Potential ingress of warm moist air from back store area should be reduced to minimum in order to provide correct ambient conditions specially for open refrigerated display cabinets.		1	
- Manual doors without forced closing device or semi-automatic doors with forced closing device	0				
- Doors with automated opening and closing	1				
			Σ (subtotal) B3	2	
B.4 Dock shelter for refrigerated vehicles					
Open ramp or sun / rain protection only	0	Unloading of refrigerated vehicles should be carried out under protected ambient conditions.		2	
Dock shelter without air condition	1				
Dock shelter directly connected to air conditioned back store area	2				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.5 Diversification of temperature ranges in refrigerated display cabinets					
Number of temperature zones with individual temperature control					
for fruit and vegetables: <= 3 temperature zones > 3 temperature zones	 0 1			1	
for chilled products: <= 2 temperature zones > 2 temperature zones	 0 1			1	
for deep frozen products: <= 1 temperature zone > 1 temperature zone	 0 1			1	
			Σ (subtotal) B5	3	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.6 Cold rooms for back store storage					
Nominal cold room temperatures for deep frozen products t > -20 °C t > -25 °C and <= -20 °C t < -25 °C	 0 0.5 1	Especially for deep frozen products a colder product has a larger tolerance to temperature increases (buffer effect). Therefore cold room temperatures should be colder than display cabinet temperatures		1	
Temperature measurement and recording of all cold rooms - None - Local thermometer or remote temperature display - Local thermometer or remote temperature display and data logger with data recording and visualization	 0 0.5 1	Due to many door openings a visualization is important in order to analyze the performance of the refrigeration system of a cold room.		1	
Alarm System for cold room temperature deviations (for all cold rooms) - No alarm system - Local alarm - Remote alarm to a constantly monitored station incl. alarm recording	 0 0.5 1	Fast information about temperature deviations offers potential for quick counter actions. The alarm system should be capable to operate even in case of breakdown of electricity.		1	
			Σ (subtotal) B6	3	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.7 Perishables preparation rooms (if applicable)					
Preparation rooms for perishables are refrigerated (not only air conditioned, t <= +10°C)	No: 0 Yes: 1.5	Perishable preparation includes e.g. packing and processing of meat.		1.5	
Special equipment for preparation of perishables (e.g. meat mincing machine) is located in refrigerated space or is equipped with internal refrigeration system	No: 0 Yes: 0.5	If no perishables are prepared on site the maximum number of points may be awarded.		0.5	
			Σ (subtotal) B7	2	
B.8 Refrigeration system for cold rooms					
Refrigerant used for cold room refrigeration		In case of direct expansion of ammonia the stored products may be contaminated by ammonia in case of refrigerant leakages.		1	
- Direct expansion of ammonia	0				
- Others (incl. indirect ammonia system)	1				
Alarm System for refrigeration system of cold rooms		Fast information about malfunctions of refrigeration system offers potential for quick counter actions. The alarm system should be capable to operate even in case of breakdown of electricity.		1	
- No alarm system	0				
- Local alarm	0.5				
- Remote alarm to a constantly monitored station incl. alarm recording	1				
			Σ (subtotal) B8	2	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.9 Centralized refrigeration system for display cabinets (if applicable)					
Accuracy of capacity control (suction pressure control) of centralized refrigeration system for display cabinets		Accurate capacity control is important in case of changing ambient conditions and when using night covers in order to avoid freezing or chilling injuries of chilled products. (If no centralized refrigeration system is used the maximum number of points may be awarded)		2	
- Capacity control with up to 2 stages (pure on/off operation)	0				
- Capacity control with up to 3 stages (e.g. two compressors with no, one or two compressors in operation)	1				
- Capacity control with more than 3 stages or continuous capacity control (e.g. frequency converter driven compressor)	2				
Alarm System for centralized refrigeration system of display cabinets		Fast information about malfunctions of refrigeration system offers potential for quick counter actions. The alarm system should be capable to operate even in case of breakdown of electricity. (If no centralized refrigeration system is used the maximum number of points may be awarded)		1	
- No alarm system	0				
- Local alarm	0.5				
- Remote alarm to a constantly monitored station incl. alarm recording	1				
			Σ (subtotal) B9	3	
B.10 In-shop transport equipment for deep frozen products					
No thermal protection is used for in-shop transport of deep frozen products	0	Deep frozen products should be protected from ambient sales room conditions during transport within the shop, stuffing of cabinets and other waiting times.		1	
Thermal blankets or insulated dollies are regularly used for in-shop transport of deep frozen products	1				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.11 Heat radiation of sales room ceiling					
Non-insulated ceiling exposed to direct sunlight	0	Heat radiation into open display cabinets depends strongly on surface temperatures / heat emission of adjacent surfaces. The ceiling is a surface which almost all refrigerated cabinets are exposed to. Therefore the ceiling temperature should be low. This requires suitable insulation. k-Value shall be calculated by thickness of insulation material and heat conductivity.		2	
Non-insulated ceiling not exposed to direct sunlight (e.g. suspended ceiling)	1				
Thermal insulation of ceiling <=0.4W/m²K or full storey above ceiling	2				
B.12 Warm air exhaust under sales room ceiling					
No air exhaust is provided directly under ceiling.	0	By removing warm air that accumulates under the ceiling the heat radiation into open display cabinets is reduced.		2	
Air exhaust is provided under ceiling so that warm air cannot accumulate	2				
B.13 Sun radiation through sales room windows					
Are display cabinets for perishables exposed to direct sunlight?	0	Direct sun light is a strong source of heat ingress.		2	
Are all display cabinets protected from direct sunlight?	2				
B.14 Turning off lighting (external and internal) during closing hours					
External light in store is turned off (or significantly reduced) during closing hours	No: 0 Yes: 0.5	Lighting (external and internal) is a source of heat		0.5	
Internal light in display cabinets is turned off during closing hours	No: 0 Yes: 0.5			0.5	
			Σ (subtotal) B14	1	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.15 Additional services / Customer support					
Refrigerated lockers for temporary storage of perishables are available for customers for short-term storage	No: 0 Yes: 0.5			0.5	
Insulated bags for transporting deep frozen products are on sale near cabinets for deep frozen foodstuffs	No: 0 Yes: 1			1	
Information to customers is provided on proper handling of perishable and temperature sensitive products during home transport (e. g. usage of insulated bags)	No: 0 Yes: 0.5	Information may be given by signs, posters, leaflets or video (etc.)		0.5	
			Σ (subtotal) B15	2	
			Σ (subtotal) B	**35**	

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
C. Perishables Display Cabinets						
Points according to separate tables C1 (fruit & vegetables), C2 (chilled cabinets), C3 (deep frozen cabinets), C4 (refrigerated service counters) and C5 (fish and seafood) for each type / model of cabinet		**Number of cabinets**	**Display opening area per cabinet (see section 4.2.5 of CCQI standard)**	**Total display opening area**	**Points**	
# 1	Display Cabinet Type #1	n_1	a_1	A_1	35	
# 2	Display Cabinet Type #2	n_2	a_2	A_2	35	
…	…	…	…	…	35	
# n	Display Cabinet Type #n	n_n	a_n	A_n	35	
Average of display cabinets		**n**		**A**	**35**	
				Σ (subtotal) C	**35**	
				Σ (total) A+B+C	**100**	

Cool Chain Quality Indicator (CCQI) for Retail Stores

Guidance for correct use and completion of this master table, see 4.2.5

Display cabinet series no.:	Display cabinet series model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
C1 Fruit and vegetables displays (includes all displays used for fruit and vegetables whether refrigerated or not)					
C1.1 Temperature control					
Without temperature control / room temperature	0	Fruit and vegetables are often displayed / stored without any temperature control or at room temperature (normal A/C). In order to prolong shelf-live reduced temperature are recommended. Temperature reduction may be achieved by different means which offer different storage temperature levels.		20	
Air conditioned room with reduced temperature (12 - 16 °C)	10				
Refrigerated open display cabinets	15				
Refrigerated closed display cabinets	18				
Fully refrigerated room (5 - 10 °C)	20				
C1.2 Humidification					
Is the display cabinet equipped with an air humidification device?	No: 0 Yes:5	Humidification of the air may increase the shelf-life of fruit & vegatable. However, direct contact with liquid water (e.g. water spraying) shall be avoided for hygienic reasons.		5	

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
C1.3	**Lighting**					
Lighting of display cabinet (external or internal) is done by						
-	Filament lamp	0	Lamps may cause high surface temperatures due to heat radiation (+2.5 - 3.5 K for filament lamps, +1.0 K for mercury lamps, +0.5 K for fluoresscent lamps) thus reducing the shelf-life.		10	
-	Mercury vapour lamp	5				
-	Fluorescent lamp	10				
				Σ (subtotal) C1	**35**	

Cool Chain Quality Indicator (CCQI) for Retail Stores

Guidance for correct use and completion of this master table, see 4.2.5

Display cabinet series no.:	**Display cabinet series model / type:**				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
C2 Chilled display cabinets (dairy, meat etc.)					
C2.1 Temperature measurement and recording					
Thermometer / Manual	0	Due to the defrost cycles that are executed by refrigerated display cabinets a visualisation is important in order to analyse the performance of the cabinet.		4	
Remote monitoring	2				
Remote monitoring and recording incl. trend graph	4				
C2.2 Temperature alarm system					
No alarm in case of temperature deviation	0	In case of temperature deviations an alarm should be generated in order to enable counter actions.		5	
Local alarm at display cabinet or control panel (visual and/or acustic alarm) is generated in case of temperature deviations	3				
Remote alarm at a constanly monitored station is generated in case of temperature deviations	5				

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
C2.3	**Type of defrost system**					
The air cooler of the cabinet is defrosted by						
-	electric heating	0	Electric heaters are causing high surface temperatures. Warm gas or brine defrost is more efficient and reduces heat ingress and defrost time. Natural defrosting does not cause any additional heat ingress.		4	
-	warm gas from refrigerant circuit or warm brine	3				
-	natural defrost (air circulation only)	4				
C2.4	**Lighting within refrigerated space**					
Lighting of display cabinet (external or internal) is done by						
-	Fluorescent tube and electronic ballast is installed within refrigerated space	0	Internal lamps and electronic ballast are heat sources and should not be located within the refrigerated space. Perishables stored close to such components may be subject to increased temperatures.		5	
-	Only fluorescent tube is arranged within refrigerated space	3				
-	No internal lighting (external lighting may be installed in head rail)	5				
C2.5	**Stacking limit**					
Is the display cabinet provided with a clearly visible mark for the stacking limit (only applicable for horizontal display cabinets)?		No: 0 Yes: 4	Overloading of refrigerated display cabinets will affect the air curtain thus causing increased ingress of ambient air. (for vertical cabinets the maximum number of points may be awarded)		4	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C2.6 Night covers					
In case of open cabinets: Is there a cover available and used for protection of PTSP during closing hours? - No cover - Curtain without radiation shield (to outside) - Curtain with radiation shield (to outside) - Insulated cover within air flow - Insulated cover outside air flow	0 4 5 7 9	Night covers are important to recover product temperatures during closing hours. Due to decrease ingress of humidity the number of defrost cycles can be reduced. Furthermore the use of night covers reduces energy consumption.		9	
C2.7 Freeze protection					
Is the display cabinet equipped with individual supply air temperature control and/or evaporation pressure control?	No: 0 Yes: 4	In order to avoid freezing of chilled products when night covers are in place the supply air temperature must be limited.		4	
			Σ (subtotal) C2	**35**	

Cool Chain Quality Indicator (CCQI) for Retail Stores

Guidance for correct use and completion of this master table, see 4.2.5

Display cabinet series no.:	Display cabinet series model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
C3 Deep frozen display cabinets					
C3.1 Temperature measurement and recording					
Thermometer / Manual	0	Due to the defrost cycles that are executed by refrigerated display cabinets a visualisation is important in order to analyse the performance of the cabinet.		4	
Remote monitoring	2				
Remote monitoring and recording incl. trend graph	4				
C3.2 Temperature alarm system					
No alarm in case of temperature deviation	0	In case of temperature deviations an alarm should be generated in order to enable counter actions.		5	
Local alarm at display cabinet or control panel (visual and/or acustic alarm) is generated in case of temperature deviations	3				
Remote alarm at a constanly monitored station is generated in case of temperature deviations	5				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C3.3 Type of defrost system					
The air cooler of the cabinet is defrosted by					
- electric heating	0	Electric heaters are causing high surface temperatures. Warm gas or brine defrost is more efficient and reduces heat ingress and defrost time.		5	
- warm gas from refrigerant circuit or warm brine	5				
C3.4 Lighting within refrigerated space					
Lighting of display cabinet (external or internal) is done by					
- Fluorescent tube and electronic ballast is installed within refrigerated space	0	Internal lamps and electronic ballast are heat sources and should not be located within the refrigerated space. Perishables stored close to such components may be subject to increased temperatures.		5	
- Only fluorescent tube is arranged within refrigerated space	3				
- No internal lighting (external lighting may be installed in head rail)	5				
C3.5 Stacking limit					
Is the display cabinet provided with a clearly visible mark for the stacking limit (only applicable for horizontal display cabinets)?	No: 0 Yes: 5	Overloading of refrigerated display cabinets will affect the air curtain thus causing increased ingress of ambient air. (for vertical cabinets the maximum number of points may be awarded)		5	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C3.6 Covers for display cabinets					
In case of open cabinets: Is there a cover available and used for protection of PTSP during closing hours?				11	
- No cover	0				
- Curtain without radiation shield (to outside)	2	Night covers are important to recover product temperatures during closing hours. Due to decrease ingress of humidity the numer of defrost cycles can be reduced. Furthermore the use of night covers reduces energy consumption.			
- Curtain with radiation shield (to outside)	3				
- Insulated cover within air flow	5				
- Insulated cover outside air flow	8				
Permanently installed cover (also during opening hours, e.g. sliding glass cover, glass doors)	11	Anti-condensation heaters are heat sources. Perishables stored close to such components may be subject to increased temperatures.			
			Σ (subtotal) C3	**35**	

Cool Chain Quality Indicator (CCQI) for Retail Stores

Guidance for correct use and completion of this master table, see 4.2.5

Display cabinet series no.:	Display cabinet series model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
C4 Refrigerated service counters					
C4.1 Temperature measurement and recording					
Thermometer / Manual	0	Due to the defrost cycles that are executed by refrigerated display cabinets and handling operations for servicing customers a visualisation is important in order to analyse the performance of the counter.		6	
Remote monitoring	4				
Remote monitoring and recording incl. trend graph	6				
C4.2 Temperature alarm system					
No alarm in case of temperature deviation	0	In case of temperature deviations an alarm should be generated in order to enable counter actions.		6	
Local alarm at display cabinet or control panel (visual and/or acustic alarm) is generated in case of temperature deviations	4				
Remote alarm at a constanly monitored station is generated in case of temperature deviations	6				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C4.3 Type of defrost system					
The air cooler of the service counter is defrosted by					
- electric heating	0	Electric heaters are causing high surface temperatures. Warm gas or brine defrost is more efficient and reduces heat ingress and defrost time. Natural defrosting does not cause any additional heat ingress.		6	
- warm gas from refrigerant circuit or warm brine	4				
- natural defrost (air circualtion only)	6				
C4.4 Lighting within refrigerated space					
Lighting of the service counter (external or internal) is done by					
- 2 rows of fluorescent tubes and electronic ballast is installed within refrigerated space	0	Internal lamps and electronic ballast are heat sources and should not be located within the refrigerated space. Perishables stored close to such components may be subject to increased temperatures.		7	
- 2 rows of only fluorescent tube is arranged within refrigerated space	2				
- 1 row of fluorescent tubes and electronic ballast is installed within refrigerated space	2				
1 row of only fluorescent tube is arranged within refrigerated space	5				
- No internal lighting (external lighting may be installed)	7				
C4.5 Stacking limit					
Is the service counter provided with a clearly visible mark for the stacking limit?	No: 0 Yes: 6	Overloading of refrigerated service counters will affect the surface temperatures of the products significantly.		6	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C4.6 Freeze protection					
Is the service counter equipped with individual evaporation pressure control?	No: 0 Yes: 4	In order to avoid freezing of chilled products, especially in case of contact cooling or changing ambient conditions evaporation temperature must be limited.		4	
			Σ (subtotal) C4	**35**	

Cool Chain Quality Indicator (CCQI) for Retail Stores

Guidance for correct use and completion of this master table, see 4.2.5

Display cabinet series no.:	Display cabinet series model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
C5 Fish & Seafood display					
C5.1 Type of refrigeration					
Fish and seafood are displayed on ice on/in					
- Open table without refrigeration	10	Active refrigeration reduces the consumption of ice and lowers the surface temperatures of the product that is not covered by ice.		20	
- Closed table (glass cover) without refrigeration	15				
- Closed display (glass cover) with refrigeration and forced air circulation	20				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C5.2 Renewal of ice					
Is the ice in the display renewed by fresh ice every day?	No: 0 Yes: 3	Daily ice renewal is important for hygienc reasons.		3	
If an ice maker is used: Is it possible to clean the ice maker?	No: 0 Yes: 3	Cleaning of ice maker is important for hygienc reasons. (if not applicable the maximum number of points may be awarded)		3	
If ice is supplied from external sources: Is the ice packed?	No: 0 Yes: 3	Packed ice is protected from contamination during handling. (if not applicable the maximum number of points may be awarded)		3	
			Σ (subtotal) C5.2	9	
C5.3 Lighting					
Lighting of display (external or internal) is done by					
- Filament lamp	0	Lamps may cause high surface temperatures due to heat radiation (+2.5 - 3.5 K for filament lamps, +1.0 K for mercury lamps, +0.5 K for fluoresscent lamps) thus reducing the shelf-life.		6	
- Mercury vapour lamp	3				
- Fluorescent lamp	6				
			Σ (subtotal) C5	**35**	

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Annex II.6

Cool Chain Quality Indicator

CCQI Master Table

Air Transport

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Air Transport

Guidance for correct use and completion of this master table, see 4.2.6

ID no.:		Operation / Location:			
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Instructions for Captain on perishables and temperature sensitive products (PTSP)					
Flight Captains are provided with a load list of all PTSP on board including the recommended hold temperatures - No - Yes	 0 10	In order to be able to set the optimum temperature for each cargo hold the captain has to be informed accordingly.		10	
A.2 Training for load masters (or relevant authority) involved in loading of perishables and temperature sensitive products (PTSP)					
Management provides PTSP-related training to persons who are responsible for the loading pattern of the cargo inside an aircraft (load master or relevant authority) - No - Yes	 0 30	Training is particularly important to load masters. Training may be conducted by officially licensed organisations or by company internal trainers. Training for load masters shall especially include cargo requirements and compatibility, type and requirements of packaging and proper documentation.		30	

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
A.3	**Equipment for load masters (or relevant authority) involved in transport of PTSP**					
Load masters (or relevant authority) are equipped with handheld thermometer in order to perform temperature checks if necessary.			If PTSP is suspected to have temperature deviations prior to loading into the aircraft the load master must able to carry out temperature checks.		10	
-	No	0				
-	Yes	10				
				Σ (subtotal) A	**50**	

B.	**Aircraft**			
Points according to separate tables B for each type / model of aircraft		**Number of aircraft of same type / model**	**Points**	
# 1	Aircraft Type #1	n1	50	
# 2	Aircraft Type #2	n2	50	
…	…	…	50	
# n	Aircraft Type #n	nn	50	
	Average of aircraft fleet	**n**	**50**	
		Σ (subtotal) B	**50**	
		Σ (total) A+B	**100**	

Cool Chain Quality Indicator (CCQI) for Air Transport

Guidance for correct use and completion of this master table, see 4.2.6

Aircraft no.:	Aircraft model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
B. Aircraft equipment					
B.1 Temperature control of Cargo Spaces					
Kind of temperature control in cargo spaces:		If at least one of the cargo compartments (main deck, forward or aft hold) is equipped with basic or optimum temperature control the respective points (15 or 30) will be granted.		30	
- No temperature control: No ability to control hold temperature on ground and in-flight.	0				
- Basic temperature control: Having only an "on/off" switch for hold temperature control on ground and in-flight.	15				
- Optimum temperature control: Having multiple settings or exact temperature settings to control hold temperature on ground and in-flight.	30				
B.2 Temperature display					
Display of actual cargo hold temperatures in the cockpit:		Display of the cargo hold temperatures in the cockpit will enable the pilot to detect malfunctions of the temperature control.		10	
- No	0				
- Yes	10				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.3 Temperature recording					
Temperature controlled cargo holds are equipped with temperature recorders: - No - Yes	 0 10	Temperature recorders provide documentation of the temperature history.		10	
Σ (subtotal) B				**50**	

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Annex II.7

Cool Chain Quality Indicator

CCQI Master Table

ULD Services

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Air Cargo Temperature Controlled ULDs

Guidance for correct use and completion of this master table, see 4.2.7

	Air cargo container model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Advisory services to customers					
Dedicated recommendations are available to users concerning:					
- Transport conditions of perishables and temperature sensitive products (PTSP) / typical container temperature set points / product compatibility	No: 0 Yes:5	Recommendations may be made available by appropriate brochures		5	
- Operation manual available to users	No: 0 Yes:5	Operational instructions may be printed on ULDs		5	
- Instruction for packaging and preparations for loading cargo	No: 0 Yes:5	can be printed on ULDs		5	
- Transportation plan identifying in transit measures	No: 0 Yes:5	e.g. Re-charge/re-icing		5	
			Σ (subtotal) A1	20	
A.2 Servicing Instructions					
Instructions are available and enforced concerning servicing of temperature controlled ULDs during transit including - re-icing - battery change - battery charging - availability and handling of dry ice - availability of battery chargers incl. suitable connectors / cables	No: 0 Yes:5			5	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.3 Technical maintenance / repairs of air cargo Temperature Controlled ULDs					
- Regular maintenance of the equipment including visual inspection of the insulation and functional check of the refrigeration system is conducted by trained personnel according to established procedures	No: 0 Yes: 5	not only CMM (Component Maintenance Manual) but also temperature control capability		5	
- Functional/technical check of containers are carried out before use according to written instructions concerning the performance of PTIs (Pre Trip Inspections)	No: 0 Yes: 5			5	
- Preventive maintenance is conducted on the basis of analysis of causes for malfunctions of equipment.	No: 0 Yes: 5			5	
			Σ (subtotal) A3	15	
A.4 Hygienic maintenance of air cargo Temperature Controlled ULDs					
Suitable cleaning of air cargo container is carried out				4	
- As deemed necessary after inspection	0				
- After every cargo voyage (dry or refrigerated)	4				
A.5 Training for personnel involved in handling of temperature controlled ULDs					
- Management provides no PTSP-related training	0			6	
- Management provides training on PTSP related subjects occasionally	3				
- Management provides PTSP related training according to a training plan including measures for emergency situations	6				
			Σ (subtotal) A	**50**	

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
B.	**Temperature Controlled ULDs**					
Points according to separate tables B for each type / model of Temperature Controlled ULD series			**Number of ULDs of series**		**Points**	
# 1	Temperature Controlled ULD Type #1		n_1		50	
# 2	Temperature Controlled ULD Type #2		n_2		50	
…	…		…		50	
# n	Temperature Controlled ULD Type #n		n_n		50	
Average of Temperature Controlled ULD fleet			**n**		**50**	
				Σ (subtotal) B	**50**	
				Σ (total) A+B	**100**	

Cool Chain Quality Indicator (CCQI) for Temperature Controlled ULDs

Guidance for correct use and completion of this master table, see 4.2.7

ULD series no.:	ULD series model / type:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
B. Air cargo Temperature Controlled ULDs					
B.1 Age of ULDs					
Age of Container series				5	
< 5 years	5				
>= 5 years and < 10 years	3				
>= 10 years and < 15 years	2				
>= 15 years	0				
B.2 Temperature control of ULDs					
Kind of temperature control of ULD:				10	
- No temperature control, but fully insulated	0	Refrigeration may be provided by means of dry ice, wet ice, gel packs or mechanical refrigeration. Temperature control requires forced air ventilation inside ULD. Heating may be provided by electrical energy.			
- Advanced temperature control: ULD is fully insulated and can be cooled to specified temperature set points, but can not be heated	6				
- Full temperature control: ULD is fully insulated and can be refrigerated and heated to specified temperature set points	10				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.3 Certified Equipment					
Insulation and refrigeration capacity (if applicable) of ULDs is certified by independent body when new:		Certification ensures that the physical capabilities of the ULDs are known and can be used for calculation purposes		2	
- No	0				
- Yes	2				
B.4 Temperature monitoring					
Container series is equipped with external temperature display of internal temperature	No: 0 Yes:10	Temperature display is important for temperature checks without the need to open ULD		10	
B.5 Temperature recording					
Container series is				10	
- not equipped with temperature recorders	0				
- equipped with chart recorders and/or data logger recording one cargo space air temperature (supply or return air)	4				
- equipped with chart recorders and/or data logger recording one cargo space air temperature (supply or return air) and ambient temperature	7				
- equipped with chart recorders and/or data logger recording cargo space air temperature, ambient temperature and additional event information	10	events such as door openings, chargings and control unit configurations should be available			
B.6 Alert / Alarm system					
Container series is equipped with alert / alarm system for		Signalization of alarms shall be clearly visible outside of the ULD. Detailed information about the nature of the alarm may be accessible by manual interaction			
- Deviation of cargo space temperature	2			2	
- Too high / Too low ambient temperature	2			2	
- Power source status (change battery)	2			2	
- Special handling actions required (e.g. re-icing)	1			1	
- Malfunction of temperature control equipment	1			1	
			Σ (subtotal) B6	8	

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
B.7	**Security**					
-	Cargo space is lockable with padlock or seals to ensure that goods cannot be accessed during transport	No: 0 Yes:2			2	
-	Controller compartment is lockable to prevent unauthorized access	No: 0 Yes:1			1	
				Σ (subtotal) B7	3	
B.8	**Forklift ability**					
Container series is						
-	not forklift able	0			2	
-	forklift able from 1 to 2 sides	1				
-	forklift able from 3 to 4 sides	2				
				Σ (subtotal) B	**50**	

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Annex II.8

Cool Chain Quality Indicator

CCQI Master Table

Apron Handling at Airports

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Apron Handling at Airports

Guidance for correct use and completion of this master table, see 4.2.8

ID no.:		Operation / Location:			
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Instructions for handlers					
Dedicated instructions are available to personnel involved in handling of PTSP for		It is particularly important to avoid situations where PTSP are exposed to excessive (high or low) ambient temperatures when awaiting loading or when unloaded.			
- basic handling and storage of perishables and temperature sensitive products (PTSP)	No: 0 Yes: 10			10	
- procedure how to reduce temperature deviations in case of waiting times	No: 0 Yes: 20			20	
			Σ (subtotal) A1	**30**	
A.2 Training for personnel involved in handling of perishables and temperature sensitive products (PTSP)					
Management provides no PTSP-related training	0	Training may be conducted by officially licensed organisations or by company internal trainers.		10	
Management provides training on PTSP related subjects occasionally	5				
Management provides PTSP related training according to a training plan including measures for emergency situations (delay or re-routing)	10				
			Σ (subtotal) A	**40**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B. Facilities and handling equipment					
B.1 Transport equipment					
PTSP are carried from/to short term store to/from the aircraft by means of		During transport on the apron cargo may be exposed to sun radiation, rain, wind etc. and requires adequate protection, especially during waiting times. If different means of transport are used an average shall be determined (see 4.2.5)		20	
- forklifts	0				
- open trucks / dollies or similar equipment	3				
- closed trucks (non insulated, e.g. tarpaulin) or standard Unit Load Devices (ULDs)	7				
- insulated trucks, dollies or other equipment (not temperature controlled)	15				
- temperature controlled trucks, dollies or other equipment	20				
B.2 Protective facilities/ equipment					
Availability of adequate short term storage for protection of cargo during waiting times:		Cargo must be protected from temperature deviations during waiting times.		20	
- none	0				
- Shaded area outside or sun protection blankets are available.	7				
- Warehouse	10				
- Temperature controlled warehouse or temperature controlled loading device (see B.1)	20				
B.3 Location of handling center					
Handling center is located on the airside (no customs border on the way to the aircraft).	No: 0 Yes: 8	Time is essential for the transport from the handling center to the aircraft.		8	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.4 Road conditions					
Roadway to apron is - unpaved - paved (poor condition) - paved (good condition)	 0 4 6	Bad roads result in long driving times that might cause temperature and/or mechanical damage to the cargo. If no roads need to be used to reach the apron (handling center with direct access to apron) the maximum number of points may be awarded.		6	
B.5 Dedicated freighter apron					
Availability of dedicated freighter apron	No: 0 Yes: 6	Dividing the apron into dedicated freight and passenger areas helps to avoid congestion and therefore cuts down transport time.		6	
			Σ (subtotal) B	**60**	
			Σ (total) A+B	**100**	

Annex II.9.1

Cool Chain Quality Indicator

CCQI Master Table

Container Line

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Container Line

Guidance for correct use and completion of this master table, see 4.2.9.1

ID no.:	Container Line:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A Organization					
A.1 Contractual agreements for cool chain related services					
Are there uniform requirements for contracts with **container terminals** concerning - electrical power supply of an agreed number of reefer containers at the terminal - temperature checks on acceptance of containers - temperature and alarm monitoring incl. inspection intervals - availability of reefer repair services	No: 0 Yes: 8	Terminal contracts may vary from terminal to terminal. However, in order to ensure uniform quality such contracts shall include comparable clauses covering the main cool chain related services as listed. Contracts may refer to general reefer container handling instructions of the shipping line		8	
Are there uniform requirements for contracts with **container ships** (own, chartered, allied, booked) concerning - maximum number of reefer containers (with definition of cargo type) - intervals for manual inspections and monitoring of reefer containers - procedures concerning repairs upon malfunctions - store keeping of spare parts for reefer aggregates - filing of temperature records	No: 0 Yes: 8	Requirements maybe part of a Charter Party, an alliance agreement, other transport contracts (e.g. with feeder vessels) or general reefer container handling instructions of the shipping line		8	
Are there uniform requirements for contracts with **container repair shops** concerning - scope of PTIs - usage of spare parts for repairs (new/used) - documentation of M&R services	No: 0 Yes: 8	M&R works and PTIs should be as uniform as possible throughout the organization		8	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
Are there uniform requirements for contracts with service providers for **container trucking** concerning - electric power supply during road transport - temperature checks on acceptance of containers - temperature and alarm monitoring incl. inspection intervals	No: 0 Yes: 8	Requirements maybe part of the contract or part of general reefer container handling instructions of the shipping line.		8	
			Σ (subtotal) A.1	**32**	
A.2 Verification of chartered ships					
Chartered ships to be employed for the transport of reefer containers are individually checked for their suitability by verification of - installed electrical power (with anyone generator in spare) versus number of reefer containers - installed hold ventilation versus number of reefer containers in hold - accessibility of reefer container units for monitoring and repairs	No: 0 Yes: 10	Minimum requirements shall be available in writing. Typically, the installed electrical power should be greater than 8 kW / FEU and for heat removal by air the fresh air ventilation rate should be 4,500 m³/h per FEU . (A detailed calculation of power and ventilation demand depends on container and cargo type).		10	
Installations relevant for the carriage of refrigerated containers on chartered ships are inspected prior to the initial employment of the ship by shipping line's representative ("on-hire inspection")	No: 0 Yes: 10	Scope of inspections shall be in line with detailed written instructions / procedures. Results of inspections shall be documented.		10	
			Σ (subtotal) A.2	**20**	
A.3 Power supply during inland transport					
Power supply to reefer containers during inland transport is provided - as requested by the customer or as deemed necessary by shipping line - based on company internal instructions that may take into consideration distance and duration of the inland transport, type of cargo and ambient temperature. - in any case for all active reefer containers	0 4 8	Power supply may be provided by clip-on gensets, trailer with under slung gensets or by truck-driven generators or power packs for the supply of several containers (in case of rail transport)		8	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.4 Disclosure of temperature recordings					
Temperature recordings available to the shipping line are not made available to cargo interests. Temperature recordings available to the shipping line are made available to cargo interests only in case of formal cargo claims Temperature recordings available to the shipping line are made available to cargo interests if requested	0 2 5	Disclosure of temperature records is considered best proof of cool chain quality. Provision of cargo interests with temperature records may be part of an extra service.		5	
A.5 Advisory services					
Advisory services from shore to ships carrying reefer containers in case of breakdown of refrigeration units is available by telephone or email hotline (response time less than 6 hours)	No: 0 Yes: 10	Crew on board of ships may not always be experienced with all reefer container models		10	
Cool order information service (hotline) to contractors handling reefer containers is available any time by telephone or email (response time less than 6 hours) being able to provide clear temperature and fresh air instructions in case of missing, unclear or contradictious cool orders	No: 0 Yes: 10	Missing or unclear temperature instructions are often a problem when accepting reefer containers and have to be clarified on short notice. Contractors include terminals, ships, trucks, repair shops.		10	
			Σ (subtotal) A.5	**20**	
A.6 Repair kits					
Repair kits incl. repair instructions are made available to all ships carrying own containers (incl. long-term leased)	No: 0 Yes: 10	Repair kits are necessary to enable crew to carry out repairs of reefer containers.		10	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.7 Stow planning					
Stow planners are provided with all relevant information about vessels abilities and restrictions concerning the carriage of reefer containers.	No: 0 Yes: 5	Restrictions may depend on proportion of cargo types (deep-frozen / chilled / fruit).		5	
			Σ (subtotal) A	**100**	
			Σ (total) A	**100**	

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Annex II.9.2

Cool Chain Quality Indicator

CCQI Master Table

Container Ship

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Container Ship

Guidance for correct use and completion of this master table, see 4.2.9.2

ID-no.:	Container Ship Name / Call sign:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
C Organisation					
C.1 Instructions to ship's crew					
Dedicated instructions are available to ship's crew concerning					
- connection and disconnection of reefer containers	No: 0 Yes: 2	Connection and disconnection of reefer containers may be carried out by ship's crew or stevedores.		2	
- temperature checks (actual value and verification of set point vs. cool order) and check of fresh air exchange on acceptance	No: 0 Yes: 2	Instructions for temperature checks allow the temperature readings to be analysed later on, i.e. locations for measurements need to be defined.		2	
- operation of cargo hold ventilation system	No: 0 Yes: 2	Instructions shall include height adjustment of supply air outlets (where provided)		2	
- manual inspections and temperature monitoring	No: 0 Yes: 2	Intervals of manual inspections and form of manual temperature records shall be specified.		2	
- filing of temperature records	No: 0 Yes: 2	Temperature records may be filed on board or on shore.		2	
- documentation of malfunctions, repairs and spare part consumption	No: 0 Yes: 2	Documentation may vary depending on container owners.		2	
			Σ (subtotal) C.1	**12**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C.2 Qualification of ship's crew involved in the transport of reefer containers					
Basic knowledge about reefer container transport and transport requirements for typical commodities is provided	No: 0 Yes: 8	Basic knowledge can be provided by suitable literature on board or by training courses.		8	
Dedicated training concerning operation and repairs of reefer containers from electrical and mechanical points of view is provided to ship's electrician(s) / reefer technician(s) / engineer(s) taking care of reefer containers	No: 0 Yes: 10	It is recommended that personnel involved in repairs of reefer containers has attended appropriate training courses.		10	
			Σ (subtotal) C.2	**18**	
C.3 Technical maintenance of on-board installations					
Maintenance is conducted to electrical power generation plant on the basis of planned maintenance schedule.	No: 0 Yes: 5	Maintenance schedule shall include scope and interval of maintenance including records of maintenance and repairs done.		5	
Installations needed for the safe operation of reefer containers (power sockets, electrical distributions, hold ventilation system, cooling water system etc.) are checked on a regular basis and repairs are carried out if necessary	No: 0 Yes: 5	Schedule of checks and repairs carried out shall be documented.		5	
			Σ (subtotal) C.3	**10**	
			Σ (subtotal) C	**40**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
D Ship's equipment					
D.1 Power supply					
Design and size of vessel's electrical power generation system is based on				15	
- internal calculations from ship yard without taking into consideration types of cargo	0				
- internal calculations from ship yard or owners / operators taking into consideration the number of reefer containers and types of cargoes or recommendations from recognized classification societies	10	Power generation shall be sufficient to supply all reefer containers on board with anyone generator out of order under seagoing conditions. e.g. the "Guidelines for the carriage of refrigerated containers on board ships" of Germanischer Lloyd will be regarded as adequate			
- recommendations from recognized classification societies including certification hereof	15	e.g. class notation "RCP" of Germanischer Lloyd			
D.2 Power sharing units for reefer containers					
Vessel is equipped with power sharing units for alternating operation of reefer containers	No: 10 Yes: 0	Power sharing units do not ensure continuous refrigeration		10	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
D.3 Hold ventilation system					
Design and size of vessel's hold ventilation system for under deck transport of reefer containers is based on		If vessel is not equipped with reefer container sockets in cargo holds the maximum number of points may be assigned			
- internal calculations from ship yard without taking into consideration the types of cargoes	0				
- internal calculations from ship yard or owners / operators taking into consideration the maximum number of reefer containers in cargo holds and types of cargoes or recommendations from recognized classification societies	10	Hold ventilation shall be sufficient to remove the heat from all reefer containers in hold under worst case conditions. e.g. the "Guidelines for the carriage of refrigerated containers on board ships" of Germanischer Lloyd will be regarded as adequate		15	
- recommendations from recognized classification societies including certification hereof	15	e.g. class notation "RCP" of Germanischer Lloyd			
D.4 Accessibility					
All container refrigeration units are accessible for monitoring and repairs					
No	0				
Yes, by using fixed and mobile platforms and/or ladders	5	All reefer containers should be accessible for monitoring and repairs. It is recommended that repairs can be carried out from fixed platforms at the same level as the container refrigeration unit.		10	
Yes, by means of fixed platforms and/or lashing bridges	10				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
D.5 Remote Monitoring					
Vessel is not equipped with Power Line Remote Monitoring system	0	Large numbers of reefer containers can only be reliably monitored by using a power line remote monitoring system which also provides immediate alarm indication. For the integration of containers without modem a manual data input is useful.		10	
Vessel is equipped with Power Line Remote Monitoring system	8				
Vessel is equipped with Power Line Remote Monitoring system including interface for manual input of data from reefer containers without communication	10				
			Σ (subtotal) D	**60**	
			Σ (total) C+D	**100**	

Cool Chain Quality Indicator (CCQI) for Container Ships

Guidance for correct use and completion of this master table, see 4.2.9.2

ID no.:		Ship Manager:			
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A Organization					
not applicable					
B Container Ships					
Points according to separate tables C+D for each ship				**Points**	
# 1 Ship #1				100	
# 2 Ship #2				100	
… …				100	
# n Ship #n				100	
Average of ship fleet				**100**	
			Σ (subtotal) B	**100**	
			Σ (total)	**100**	

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Annex II.9.3

Cool Chain Quality Indicator

CCQI Master Table

Container Terminal

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Container Terminal

Guidance for correct use and completion of this master table, see 4.2.9.3

ID-no.:	Name of terminal:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A Organization					
A.1 Instructions to terminal personnel					
Dedicated instructions are available to terminal personnel concerning					
- acceptance checks including: - physical check of container and machinery (incl. cable and plug) - temperature check (actual value and verification of set point vs. cool order) - check of fresh air exchange	No: 0 Yes: 5	Scope of physical checks may be defined in a standard agreed between contracting parties.		5	
- actions to be taken in case of deviations (temperature set point, actual temperature, machinery malfunction, mechanical damages) incl. list of persons to be contacted	No: 0 Yes: 5	Instructions usually vary from customer to customer (shipping lines) as contractually agreed and have therefore to be properly documented and communicated throughout the personnel involved in the operation of reefer containers.		5	
- connection and disconnection of reefer containers	No: 0 Yes: 4			4	
- manual inspections and temperature monitoring	No: 0 Yes: 4			4	
- filing of temperature records (incl. change of charts)	No: 0 Yes: 4			4	
- documentation of malfunctions and repairs	No: 0 Yes: 3			3	
			Σ (subtotal) A.1	**25**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.2 Qualification of terminal personnel involved in the operation of reefer containers					
Basic knowledge about reefer container operation and transport requirements for typical commodities is provided incl. detection of malfunctions	No: 0 Yes: 10	Basic knowledge should be provided by suitable training courses.		10	
A.3 Availability of services					
Are services for reefer containers (acceptance, connection and monitoring) provided 24 hours a day / 365 days per year.	No: 0 Yes: 10	Delays in power supply and periods of no or reduced monitoring have to be avoided.		10	
A.4 Utilization ratio and capacity planning of reefer container positions					
Terminal analyses the utilization ratio of the reefer container positions on a daily basis	No: 0 Yes: 5	Utilization analysis shall be on record.		5	
Terminal performs short and medium / long term prediction of utilization of reefer container positions	No: 0 Yes: 5	Prediction should be used to ensure sufficient power supply to reefer containers under all seasonal conditions. For short term planning use of power-packs may be sufficient. For medium / long term planning fixed installations should be extended.		5	
			Σ (subtotal) A.4	**10**	
			Σ (subtotal) A	**55**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B Terminal's equipment					
B.1 Redundant power supply					
Terminal is equipped with redundant power supply (e.g. two cables / transformers or emergency generator)	No: 0 Yes: 5	Redundant power supply reduces potential for power-off periods		5	
B.2 Power sharing units for reefer containers					
Terminal is equipped with power sharing units for alternating operation of reefer containers	No: 10 Yes: 0	Power sharing units do not ensure continuous refrigeration		10	
B.3 Accessibility					
All container refrigeration units are accessible for monitoring and repairs No Yes, by using mobile platforms and/or ladders Yes, by means of fixed platforms	 0 5 10	All reefer containers should be accessible for monitoring and repairs. It is recommended that repairs can be carried out from fixed platforms at the same level as the container refrigeration unit.		10	
B.4 Remote monitoring and alarm system					
Terminal is not equipped with power line remote monitoring system Terminal is equipped with power line remote monitoring system Terminal is equipped with power line remote monitoring system incl. remote alarm system to terminal personnel (e.g. by SMS)	0 3 4	Large numbers of reefer containers can only be reliably monitored by using a power line remote monitoring system which also provides immediate alarm indication.		4	
Remote Monitoring system includes interface for manual input of data from reefer containers without communication	1	For the integration of containers without modem a manual data input is useful.		1	
			Σ (subtotal) B.4	**5**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.5 Ground conditions					
Terminal ground (roadways and storage positions) is - unpaved - paved	 0 5			5	
B.6 Reefer container repair services					
Maintenance and repair services are available at any time and on short notice	No: 0 Yes: 5	It is recommended to have a reefer container repair shop near by in order to ensure short response time in case of malfunctions of container refrigeration units		5	
B.7 Border inspection post					
Border inspection post for veterinary controls is situated on terminal	No: 0 Yes: 5	It is recommended to have a border inspection post on the terminal in order to be able to perform all import inspections on site.		5	
			Σ (subtotal) B	**45**	
			Σ (total) A+B	**100**	

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Annex II.9.4

Cool Chain Quality Indicator

CCQI Master Table

Reefer Containers

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Integral Reefer Containers

Guidance for correct use and completion of this master table, see 4.2.9.4

ID no.:	Operation / Location:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Advisory services to customers					
Dedicated recommendations are available to customers concerning:					
- transport conditions of perishables and temperature sensitive products (PTSP) / typical container temperature set points	No: 0 Yes: 5	Recommendations shall be available in writing. Recommendations should include compatibility of PTSP.		5	
- stowage of cargoes in reefer containers ("To Do" list)	No: 0 Yes: 5			5	
- check of containers before stuffing of the cargo	No: 0 Yes: 5			5	
			Σ (subtotal) A.1	**15**	
A.2 Technical maintenance / repairs of reefer containers					
- Maintenance and repairs of reefer containers are conducted according to a maintenance procedure (e.g. ACEP)	No: 0 Yes: 5	ACEP is a standardized maintenance procedure proposed by the operator and approved by the national authorities.		5	
- Preventive maintenance is conducted on the basis of analysis of causes for breakdowns of equipment	No: 0 Yes: 5	Failure statistics should be the basis for preventive maintenance.		5	
			Σ (subtotal) A.2	**10**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.3 Hygienic maintenance					
Intensive cleaning of reefer containers is carried out - as deemed necessary after inspection - after every cargo voyage (dry or refrigerated)	0 3	Refrigerated goods are mainly foodstuffs. In order to avoid contamination from other cargoes regular cleaning is essential. Cleaning may be done by water or steam jet.		3	
A.4 Instruction for PTIs					
Detailed written instructions concerning the performance of PTIs (Pre Trip Inspections) to repair shops / subcontractors are available	No: 0 Yes: 8	Instructions shall include a list of tests and checks to be carried out and documentation requirements		8	
A.5 Special Equipment					
Container operator offers specialized equipment for					
- super deep frozen cargo	No: 0 Yes: 2	Super deep freeze containers offer transport temperatures below -40°C		2	
- controlled atmosphere	No: 0 Yes: 2	Controlled atmosphere (CA) is the change of the gas atmosphere inside the container for the transport of fruit and vegetables		2	
			Σ (subtotal) A.5	**4**	
			Σ (subtotal) A	**40**	

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
B.	**Reefer Containers**					
Points according to separate tables C for each type / model of reefer container series			**Number of containers of series**		**Points**	
# 1	Reefer Container Type #1		n_1		60	
# 2	Reefer Container Type #2		n_2		60	
…	…		…		60	
# n	Reefer Container Type #n		n_n		60	
Average of reefer container fleet			**n**		**60**	
				Σ (subtotal) B	**60**	
				Σ (total) A+B	**100**	

Cool Chain Quality Indicator (CCQI) for Reefer Containers

Guidance for correct use and completion of this master table, see 4.2.9.4

Container series no.:		Container series model / type:			
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
C Reefer Containers used for ocean transport (not subject to ATP)					
C.1 Age of Containers					
Age of Container series		Insulation ageing is approx. 3 % per annum thus resulting in lower insulation capacity of older containers. Reefer machinery is subject to higher failure potential with age.		30	
< 5 years	30				
>= 5 years and < 10 years	20				
>= 10 years and < 15 years	10				
>= 15 years	0				
C.2 Cooling capacity					
Net cooling capacity is					
>= 10.0 kW at 1.7°C (35°F)	No: 0 Yes: 4	High cooling capacity enables fast cooling down in case of warm cargo		4	
>= 6.0 kW at -17.8°C (0°F)	No: 0 Yes: 4			4	
			Σ (subtotal) C.2	**8**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C.3 Equipment and accessories					
Container series is equipped with remote monitoring modems	No: 0 Yes: 10	Power line data transmission enables fast detection of malfunctions and proper temperature documentation		10	
Reefer machinery is equipped with de-humidification option	No: 0 Yes: 2	For the transport of onions, flower bulbs, nuts etc. the air inside the container has to be kept at low relative humidity.		2	
			Σ (subtotal) C.3	**12**	
C.4 Temperature monitoring / recording					
Container series is					
- not equipped with temperature recorders	0	Temperature recorders provide documentation of the temperature history.		10	
- equipped with chart recorders and/or data logger recording only one air temperature (supply or return)	5	Chart recorders are limited to only one temperature and limited in recording period			
- equipped with data logger recording at least supply and return air temperature and power on/off periods	8	Recording of supply and return air temperature offers better information about reefer machinery performance			
- equipped with data logger recording at least supply and return air and ambient temperature and power on/off periods	10	Recording of ambient temperature might be important in case of under deck transport of reefer containers			
			Σ (subtotal) C	**60**	

Annex II.10.1

Cool Chain Quality Indicator

CCQI Master Table

Reefer Ship Line

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Reefer Ship Line

Guidance for correct use and completion of this master table, see 4.2.10.1

ID no.:			Reefer Ship Line:		
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A Organization					
A.1 Contractual agreements for cool chain related services					
Are there uniform requirements for contracts with **reefer ships** (own and chartered) concerning - hygienic maintenance of cargo holds (cleaning of gratings etc.) - temperature checks on acceptance of refrigerated cargoes incl. instructions in case of temperature deviations / mechanical damages - intervals for manual inspections and monitoring of refrigerated cargo - notification on malfunctions of refrigeration system - filing of temperature records - store keeping of cargo handling, protection and lashing materials	No: 0 Yes: 20	Requirements may be part of a Charter Party or company internal instructions to ships		20	
Are there uniform requirements for contracts with service providers for **cargo handling (port terminals)** concerning - cargo handling, stowing and securing on ships - cargo protection during bad weather conditions - cargo storage and distribution	No: 0 Yes: 10	Requirements may be part of the contract or part of general handling instructions of the shipping line		10	
			Σ (subtotal) A.1	**30**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.2 Verification of chartered ships					
Installations relevant for the carriage of refrigerated cargo on chartered ships are inspected prior to the initial employment of the ship by shipping line's representative ("on-hire inspection") including - check of availability and condition of cargo holds (gratings, side-shorings, air cooler compartments, insulation, drains and bilges, hatch covers and gaskets) - condition of cargo gear - condition of refrigeration plant - condition of temperature monitoring and recording system - other cargo relevant installations like ozone generator, CO2 monitoring system etc.	No: 0 Yes: 30	Scope of inspections shall be in line with detailed written instructions / procedures. Results of inspections shall be documented.		30	
A.3 Advisory services					
Advisory services from shore to ships carrying refrigerated cargoes is available by telephone or email hotline in case of breakdown of refrigeration plant or propulsion system	No: 0 Yes: 10	Response time should be less than 6 hours. Within this period further steps should be agreed between ship's command and shipping line.		10	
A.4 Cargo protection, securing and handling materials					
Cargo protection, securing and handling materials is supplied to all ships carrying refrigerated cargo on demand	No: 0 Yes: 15	Materials may include air bags, slings, dunnage, cardboard, tarpaulin etc.		15	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.5 Training for Port Captains (stow planners)					
PTSP-related training to persons who are responsible for the loading pattern of the refrigerated cargo on a reefer ship (Port Captain / stow planner) is ensured by appropriate training - No - Yes	 0 15	Training may be conducted by officially licensed organizations or by company internal trainers. Training for Port Captains / stow planners shall especially include - cargo requirements and compatibility - cargo handling, protection and securing - air distribution under part loaded condition		15	
			Σ (total) A	**100**	

Annex II.10.2

Cool Chain Quality Indicator

CCQI Master Table

Reefer Ship

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Reefer Ships

Guidance for correct use and completion of this master table, see 4.2.10.2

ID no.:		Ship Manager:			
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A Organization					
not applicable					
B Ships					
Points according to separate tables C+D for each ship				**Points**	
# 1 Ship #1				100	
# 2 Ship #2				100	
… …				100	
# n Ship #n				100	
Average of ship fleet				**100**	
			Σ (subtotal) B	**100**	
			Σ (total)	**100**	

Cool Chain Quality Indicator (CCQI) for Reefer Ship

Guidance for correct use and completion of this master table, see 4.2.10.2

ID-no.:	Reefer Ship Name / Call sign:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
C Organization					
C.1 Qualification of ship's command					
Master(s) are required to have specialized reefer ship experience prior to employment?	No: 0 Yes: 10	Experience on reefer vessels may have been gained as a chief officer, super cargo or master.		10	
Chief Engineer(s) are required to have specialized reefer ship experience prior to employment?	No: 0 Yes: 10	Experience on reefer vessels may have been gained as a chief engineer, junior engineer or reefer engineer.		10	
			Σ (subtotal) C.1	**20**	
C.2 Qualification of ship's crew					
Vessel is manned with dedicated reefer engineer.	No: 0 Yes: 5	Dedicated reefer engineer is responsible and qualified for operation and maintenance of all cargo refrigeration installations.		5	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C.3 Technical maintenance of refrigerating installations					
Maintenance is conducted to refrigerating installations on the basis of planned maintenance schedule.	No: 0 Yes: 5	Maintenance schedule shall include scope and interval of maintenance including records of maintenance and repairs done.		5	
Calibration of temperature probes in the cargo holds is carried out at regular intervals (at least once per year).	No: 0 Yes: 5	Calibration may be conducted by ice water test or calibrator. Calibration results have to be documented.		5	
			Σ (subtotal) C.3	**10**	
C.4 Measuring devices					
Vessel is equipped with handheld temperature measurement probe suitable to check cargo and/or air temperatures	No: 0 Yes: 10	No temperature checks possible without suitable probes.		10	
Vessel is equipped with handheld CO_2 measurement probe suitable to check cargo hold atmosphere	No: 0 Yes: 3	CO_2 measurements is necessary during transport of respiring cargoes (if vessel is exclusively designed for non-respiring cargo the maximum number of points may be granted)		3	
Vessel is equipped with handheld O_2 measurement probe suitable to check cargo hold atmosphere	No: 0 Yes: 2	Only applicable for vessels with CA installations (if vessel is operated without CA option the maximum number of points may be granted)		2	
			Σ (subtotal) C.4	**15**	
			Σ (subtotal) C	**50**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
D Ship's equipment					
D.1 Pallet transport					
Vessel is suitable for transport of palletized cargoes	No: 0 Yes: 10	This requires - minimum deck heights 2.2 m - side shorings in cargo holds		10	
D.2 Hold ventilation system					
Cargo holds are equipped with a "Robson" type ventilation system	No: 0 Yes: 5	The "Robson" system enables better air distribution especially in part loaded conditions		5	
D.3 Cargo handling					
Vessel is equipped with own cargo handling gear.	No: 0 Yes: 5	Own handling gear ensures fast cargo handling independent from shore crane availability		5	
Cargo handling is only possible with main hatch cover open	No: 5 Yes: 0	With open main hatch cover cargo may be exposed to bad weather conditions / sun radiation. This can be reduced by installation of side doors or dedicated pallet / elevator hatches		5	
			Σ (subtotal) D.3	**10**	
D.4 Temperature monitoring / recording					
Temperature records are printed or electronically stored at regular intervals at least every 4 hours	No: 0 Yes: 5	Temperature history is important for failure analysis and claim evaluation		5	
Temperature monitoring system is capable to display trend curves of all monitored temperatures	No: 0 Yes: 5	Trend curves enable a good analysis concerning the proper function of the refrigeration		5	
			Σ (subtotal) D.4	**10**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
D.5 Ozone generator					
Vessel is equipped with ozone generator(s) for treatment of cargo hold air	No: 0 Yes: 5	Ozone is mainly used in order to eliminate odors		5	
D.6 Controlled Atmosphere					
Vessel has no installations for Controlled Atmosphere (CA) in cargo holds	0	If vessel is not designed for transportation of respiring products (fruit and vegetables) the maximum number of points may be granted.		5	
Vessel is prepared for CA (incl. nitrogen pipes, atmosphere sampling pipes, pressure relief valves, electrical connections)	4				
Vessel is equipped with fixed CA system incl. nitrogen generator	5				
D.7 CO_2 monitoring and control					
Vessel is not equipped with fixed installed CO_2 monitoring system for cargo holds	0	If vessel is not designed for transportation of respiring products (fruit and vegetables) the maximum number of points may be granted.		5	
Vessel is equipped with fixed installed CO_2 monitoring system for cargo holds	3				
CO_2 level in the holds can be controlled by automatic fresh air renewal	5				
			Σ (subtotal) D	**50**	
			Σ (total) C+D	**100**	

Annex II.10.3

Cool Chain Quality Indicator

CCQI Master Table

Sea Port Terminal

Revision: 2.0

Date: 2008-02-15

Cool Chain Quality Indicator (CCQI) for Sea Port Terminal

Guidance for correct use and completion of this master table, see 4.2.10.3

ID no.:	Port / Location:				
CCQI Description	**Points**	**Explanatory Note**	**Comments**	**max. Points**	**Points awarded**
A. Organization					
A.1 Instructions and equipment for store keepers					
Dedicated instructions are available to store keepers concerning:					
- handling and storage of perishables and temperature sensitive products (PTSP)	No: 0 Yes: 2	Instructions should include compatibility of PTSP.		2	
- compatibility of PTSP concerning cross-contamination	No: 0 Yes: 2	Instructions for temperature checks allow the temperature readings to be analyzed later on, i.e. locations for measurements need to be defined.		2	
- temperature checks on acceptance of PTSP	No: 0 Yes: 2			2	
Store keeper is equipped with a temperature measurement probe suitable to check cargo temperature on acceptance	No: 0 Yes: 6	No temperature checks possible without suitable probes.		6	
			Σ (subtotal) A1	**12**	
A.2 Availability of services					
Services are available		Opening hours of the facility should cover the actual demand of incoming and outgoing goods. Waiting times due to closed storage and handling facilities shall be avoided for goods that are not actively cooled.		2	
- from time to time	0				
- during normal office hours.	1				
- as needed including acceptance of delayed deliveries.	2				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.3 Actions taken after refrigerant leakage or machinery breakdown					
In case of breakdown of refrigeration machinery or refrigerant leak, preventive action depends on store keeper's decision / experience	0	Emergency response plan shall include procedures covering – malfunction of cooling appliance – breakdown of electric power supply – refrigerant leaks – detection of cargo damage with the aim to minimize damage to the cargo		4	
Contact person for emergency response assistance is available by phone / radio during operating hours.	2				
In case of breakdown of refrigeration machinery or refrigerant leak preventive action will be initiated according to an emergency response plan	4				
A.4 Training for cold store personnel involved in storage and handling of perishables and temperature sensitive products (PTSP)					
Management provides no PTSP-related training	0	Training is particularly important to store keepers. Training may be conducted by officially licensed organizations or by company internal trainers. Training to be conducted in line with the emergency response plans.		4	
Management provides training on PTSP related subjects occasionally	2				
Management provides PTSP related training according to a training plan including measures for emergency situations	4				
A.5 Technical maintenance of refrigerating installations and insulation					
Maintenance / repair is conducted in case of malfunctions	0	Maintenance schedule shall include scope and interval of maintenance including records of maintenance and repairs done.		6	
Maintenance is conducted to refrigerating installations on the basis of planned maintenance schedule.	6				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
A.6 Hygienic maintenance					
Cleaning of cold store is conducted as deemed necessary by the store keeper. Cleaning of cold store is based on procedures or contractual agreements on hygienic maintenance. Interval / scope and method of cleaning shall reflect type of storage and commodity.	0 4	Hygienic maintenance is mainly related to the internal surfaces of the cold store including surfaces exposed to the air flow such as evaporators and air ducting systems, and should be carried out on a regular basis.		4	
			Σ (subtotal) A	**32**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B. Storage and handling facility					
B.1 Temperature zones for storage of goods					
Temperature controlled storage rooms for the following temperature ranges are available:					
+18 ... +22 °C	No: 0 Yes: 3	All commodities should be stored at their preferred temperature ranges. If facility handles only commodities of available storage temperature ranges, the maximum number of points (12) may be awarded.		3	
+10 ... +15 °C	No: 0 Yes: 3			3	
+0 ... +4 °C	No: 0 Yes: 3			3	
< -18 °C	No: 0 Yes: 3			3	
			Σ (subtotal) B1	**12**	
B.2 Special equipment for storage and handling					
In case that non-compatible commodities are handled within the same facility: Can they be stored / handled separately?		To prevent cross-contamination - foodstuffs for human consumption - foodstuffs for non-human consumption - dangerous goods - pharmaceuticals shall be treated separately.		2	
- No	0				
- Yes	2				
- not applicable	2				
In case that non-compatible fruit and vegetables are handled within the same facility: Can cross-contamination by ethylene be avoided?		Cross-contamination of non-compatible fruit and vegetable (e.g. apples and kiwis) by ethylene gas can be avoided either by - storing the products separately - intensive fresh air ventilation - ethylene absorption		2	
- No	0				
- Yes	2				
- not applicable	2				
			Σ (subtotal) B2	**4**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.3 Spaces for commissioning / repacking					
Spaces used for commissioning / repacking are		Temperature deviations must be avoided during commissioning and repacking.		10	
- not temperature controlled	0				
- temperature controlled	10				
B.4 Arrangements to protect cargoes during landside handling					
Access doors to storage rooms are		Heat loss from cold store should be prevented during door openings.		2	
- without additional means to prevent heat loss	0				
- automated and of quick acting type or equipped with door curtain	2				
Loading / unloading operations of trucks and rail wagons are carried out via		Goods should be protected from ambient temperature conditions during loading of trucks or rail wagons.		2	
- open ramp	0				
- dock shelters	2				
			Σ (subtotal) B4	**4**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.5 Quay-side handling facilities					
Pier access for reefer ships					
- Cargo transfer between ship and terminal has to be carried out using barges (or similar).	0	Barge operation results in longer periods without temperature control and causes additional risks with regards to handling and weather exposure.		4	
- All reefer ships can be loaded / discharged directly at the pier adjacent to the terminal	4				
Loading / unloading of break-bulk cargo is carried out					
- manually	0	Goods should be handled carefully and as fast as possible. Protection from ambient conditions (temperature, weather) is preferred.		4	
- box cages, roller bands and/or conveyor belts	1				
- open elevators	2				
- closed elevators	4				
Loading / unloading of palletized cargo is carried out					
- Single pallets / slings	0	Goods should be handled carefully and as fast as possible. Protection from ambient conditions (temperature, weather) is preferred.		2	
- Pallet cages or automated pallet handling system from ship to open quay (or vice versa)	1				
- Automated pallet handling system from ship to protected handling area (or vice versa)	2				
Crane operation for loading / unloading of containers or pallet cages					
- has to be carried out by ship-own gear	0	Quay-side cranes usually offer faster and safer operation than ship-own gear.		4	
- can be done by quay-side cranes	4				
			Σ (subtotal) B5	**14**	

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
B.6 Forklift operation					
Forklifts used within the storage / handling facility and/or in cargo holds are					
- gas/diesel-driven without suitable exhaust gas filters	0	Contamination of PTSP by exhaust gas shall be avoided.		4	
- electric-driven or manually operated or gas/diesel-driven with suitable and certified exhaust gas filters / catalysators	4				
			Σ (subtotal) B	**48**	
C. Refrigeration System					
C.1 Redundant power supply					
Power supply for refrigeration machinery is provided by					
- one power line.	0	Electrical power supply is needed for the operation of the refrigeration machinery. Power supply could fail due to construction works or breakdown of energy supply.		2	
- at least two power lines	1				
- means of additional generator	2				
C.2 Type of refrigerant and refrigeration system					
- NH_3 (ammonia, R717) - Direct expansion	0	Depending on the type of refrigerant and the secondary cooling medium the goods may be subject to contamination by refrigerant gas in case of a leakage		4	
- NH_3 (ammonia, R717) - CO2 secondary system	1				
- NH_3 (ammonia, R717) - Indirect expansion (e.g. brine system)	2				
- Safety refrigerant (e.g. R134a, R404A, R22) - direct expansion	3				
- Safety refrigerant (e.g. R134a, R404A, R22) - indirect system (brine system)	4				

CCQI Description		Points	Explanatory Note	Comments	max. Points	Points awarded
C.3	**Location of components containing refrigerant**					
-	Ammonia system with valves and fittings inside cold room	0	Pipe, valves and fittings are potential leak sources. The nearer the potential leaks are in relation to the stored goods the higher the potential for contamination will be.		2	
-	Ammonia system with valves and fittings outside cold room, but within adjacent spaces	1				
-	Ammonia system with valves and fittings in open air (e.g. on roof) outside of cold rooms	2				
-	All other refrigerants in any arrangement	2				
C.4	**Arrangement of refrigeration machinery room**					
-	Ammonia system with direct connection between reefer machinery room and cold room	0	The reefer machinery room is the location with the highest potential for large scale leaks. Direct connection means doors, unsealed pipe penetrations, ventilations duct etc.		2	
-	Ammonia system where machinery room is adjacent to cold room, but without direct connection	1				
-	Ammonia system where machinery room is far away from cold room	2				
-	All other refrigerants in any arrangement	2				
C.5	**Alarm system of refrigeration system**					
In case of malfunctions or breakdown of electricity			Fast detection of a malfunction enables the operator to initiate appropriate emergency action in order to prevent damage to the goods.		3	
-	no alarm is activated	0				
-	on-site alarm is activated	3				

CCQI Description	Points	Explanatory Note	Comments	max. Points	Points awarded
C.6 Alarm system for cold rooms					
In case of temperature deviations - no alarm is activated - on-site alarm is activated	 0 3	Fast detection of a temperature deviation enables the operator to initiate appropriate emergency measures in order to prevent damage to the goods.		3	
C.7 Temperature recording					
Temperatures in refrigerated rooms are - not checked by using measurement devices - checked by handheld thermometer - monitored with fixed mounted thermometers - documented with temperature recorders	 0 1 2 4	Temperature recorders provide the best documentation of the temperature history. If thermometers are used manual recording is required at regular intervals.		4	
			Σ (subtotal) C	**20**	
			Σ (total) A+B+C	**100**	

ANNEX III

Revision: 2.0 Date: 2008-02-15

Training Topics

	Organization		Truck & Trailer		Long Term Storage		Short Term Storage		Aircraft				Apron Handling	
	Cool Chain Manager	Management / Administration	Driver	Booking Clerk	Store Keeper	Workers / Drivers	Store Keeper	Workers / Drivers	Pilots	Load Master	Booking Clerk	Workers / Cargo Handlers	Supervisor	Workers / Drivers
PTSPs / Cargo														
Basic knowledge about temperature requirements and potential damages by too high / low temperatures	❍	❍	❍		❍	❍	❍	❍	❍[1)]	❍		❍	❍	❍
Basic knowledge about commodity groups (e.g. deep frozen - chilled; respiring - non respiring; pharmaceuticals)	❍	❍	❍	❍	❍	❍	❍	❍	❍[1)]	❍	❍	❍	❍	❍
Basic knowledge on types of packaging including - Mechanical properties - Thermal properties - Use of expendable refrigerants	❍	❍	❍		❍		❍			❍			❍	
Special knowledge about commodities handled including: - Optimum storage temperature - Air renewal requirements - Optimum air humidity - Special packaging	❍				❍		❍			❍				
Stowage of PTSP cargo including: - Air flow requirements - Mechanical limitations	❍	❍	❍		❍	❍	❍	❍		❍		❍	❍	
Hygienic requirements including: - Application of cleaning procedures - Waste disposal - Pest control	❍	❍	❍		❍	❍	❍	❍		❍		❍	❍	❍
Cargo compatibility including - Respiration and its effects - Odors - Ethylene and its effects - Evaporation and water loss - Segregation between horticultural products	❍	❍	❍	❍	❍		❍			❍	❍			
Checks at acceptance points including: - Temperature Measurement on cargo - Mechanical damages - Proper packaging	❍		❍		❍		❍			❍			❍	
Refrigeration														
Basic knowledge about refrigeration machinery including: - Properties of refrigerants in use - Refrigeration cycle - Air flow distribution - Air renewal - Insulation properties - Defrosting requirements			❍		❍		❍							
Temperature Measurement on refrigeration machinery and cold store / cargo compartment			❍		❍		❍							
Equipment handling and maintenance	❍		❍		❍	❍	❍	❍		❍		❍	❍	❍
Handling, servicing and maintenance of temperature controlled ULDs	❍									❍		❍	❍	❍
Documentation														
Documentation including: - Cargo manifest / Bills of Lading - Temperature instructions - Governmental requirements - Check lists - Operational documents (e.g. NOTOC)	❍	❍	❍	❍	❍		❍		❍[1)]	❍	❍		❍	
Marking and labelling of PTSP cargo	❍				❍		❍			❍			❍	
Emergencies														
Proper reaction in emergency situations including:														
- Delays	❍		❍		❍	❍	❍	❍		❍		❍	❍	❍
- Breakdown of refrigeration	❍		❍		❍		❍						❍	
- Refrigerant leaks	❍		❍		❍		❍							
- Reporting in case of accidents, incidents, discrepancies	❍		❍		❍		❍			❍			❍	
General														
Legal background including - Responsibilities of shipper and carrier - Export and import limitations and requirement	❍	❍		❍							❍			

[1)]: PTSP related training for pilots is included in their normal high level training

COOLCHAINASSOCIATION

ANNEX III

Revision: 2.0 Date: 2008-02-15

Training Topics

	Organization		Container Line				Container Ship		Container Terminal			Reefer Containers	Reefer Ship Line				Reefer Ship	Sea Port Terminal		
	Cool Chain Manager	Management / Administration	Personnel negotiating contracts with subcontractors	Booking Clerk	Hotline staff for temperature instructions	Hotline staff for technical support	Cargo officer	Reefer technicians / Electricians	Container checker (physical checks)	Reefer staff (for connection / monitoring)	Booking clerk / Administration	Customer advisors	Charter agent	Ship inspector	Port Captains / Stowage planners	Booking clerk	Cargo officer	Store keeper	Foreman	Workers / Drivers
PTSPs / Cargo																				
Basic knowledge about temperature requirements and potential damages by too high / low temperatures	❍	❍	❍	❍	❍	❍	❍	❍		❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
Basic knowledge about commodity groups (e.g. deep frozen - chilled; respiring - non respiring; pharmaceuticals)	❍	❍	❍	❍	❍	❍	❍	❍		❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
Special knowledge about commodities handled including: - Optimum storage temperature - Air renewal requirements - Optimum air humidity - Special packaging	❍		❍		❍		❍					❍	❍		❍		❍	❍		
Stowage of PTSP cargo including: - Air flow requirements - Seaworthy stowage and securing of cargo - Mechanical limitations	❍											❍			❍		❍	❍	❍	
Hygienic requirements including: - Application of cleaning procedures - Waste disposal - Pest control	❍						❍					❍		❍	❍		❍	❍		
Cargo compatibility including - Respiration and its effects - Odors - Ethylene and its effects - Evaporation and water loss - Segregation between horticultural products	❍	❍	❍	❍	❍		❍					❍	❍	❍	❍	❍	❍	❍		
Checks at acceptance points including: - Temperature Measurement on cargo / containers - Mechanical damages / Physical checks - Temperature and fresh air set points - Proper packaging	❍				❍		❍	❍	❍	❍		❍					❍	❍		
Refrigeration																				
Basic knowledge about refrigeration machinery including: - Properties of refrigerants in use - Refrigeration cycle - Air flow distribution - Air renewal - Insulation properties - Defrosting requirements						❍	❍	❍		❍		❍		❍			❍	❍		
Temperature measurement on refrigeration machinery and cold store / cargo compartment					❍	❍	❍	❍		❍		❍					❍	❍		
Equipment handling and maintenance	❍						❍	❍		❍				❍			❍	❍		
Reefer containers																				
Basic knowledge about operation of reefer containers and properties	❍		❍	❍	❍	❍	❍	❍	❍	❍	❍	❍								
Connecting and disconnecting of reefer containers	❍					❍	❍	❍		❍		❍								
Temperature measurements on reefer containers (set temperature, supply air temperature, return air temperature); change of Partlow charts	❍				❍	❍	❍	❍		❍		❍								
Detection of malfunctions	❍				❍	❍	❍	❍		❍		❍								
Repairs of container refrigeration units						❍		❍												
Requirements for the carriage of reefer containers on board ships	❍		❍			❍	❍	❍				❍								
Documentation																				
Documentation including: - Cargo manifest / Bills of Lading - Temperature instructions - Governmental requirements - Check lists - Operational documents (e.g. temperature logs)	❍	❍	❍	❍	❍		❍			❍	❍	❍	❍		❍	❍	❍	❍		
Emergencies																				
Proper reaction in emergency situations including:																				
- Breakdown of refrigeration	❍					❍	❍	❍		❍		❍					❍	❍		
- Refrigerant leaks	❍					❍	❍	❍		❍				❍			❍	❍		
- Reporting in case of accidents, incidents, discrepancies	❍						❍	❍		❍				❍			❍	❍		
General																				
Legal background including - Responsibilities of shipper and carrier - Export and import limitations and requirements	❍	❍	❍	❍	❍		❍				❍	❍	❍			❍	❍	❍		
Cool chain related aspects of contracts with contractors (ships, trucks, terminals etc.)	❍	❍	❍										❍							

ANNEX III

Revision: 2.0 Date: 2008-02-15

Training Topics

	Organization		Retail Store		Pre-cooling	
	Cool Chain Manager	Management / Administration	Perishable Sales Manager	Shop employee	Production manager	Workers
Perishable Products						
Basic knowledge about temperature requirements and potential damages by too high / low temperatures	❍	❍	❍	❍	❍	❍
Basic knowledge about commodity groups (e.g. deep frozen - chilled; respiring - non respiring; pharmaceuticals)			❍	❍		
Basic knowledge on types of packaging including - MA packed salads - Fresh cut fruit and vegetables	❍		❍		❍	
Special knowledge about commodities handled including: - Optimum storage temperature - Optimum air humidity - Special packaging	❍		❍		❍	
Stowage of perishable products including: - Air flow requirements in display cabinets / Stacking limit - Mechanical limitations of display cabinets	❍		❍	❍		
Stowage / arrangement of perishable products in pre-coolers in order to enable efficient and homogenuous air flow	❍				❍	❍
Knowledge about the pre-cooling process(es) applied including all relevant parameters that effect the end temperature of the product	❍				❍	❍
Hygienic requirements including: - Application of cleaning procedures - Waste disposal - Pest control	❍		❍	❍	❍	❍
Product compatibility including - Respiration and its effects - Cross-contamination / Odors - Ethylene and its effects - Evaporation and water loss - Segregation between horticultural products	❍		❍		❍	
Checks at acceptance points including: - Temperature Measurement on products - Mechanical damages	❍		❍		❍	❍
Effects of radiation heat from lamps and hot surfaces on product temperatures	❍		❍			
Usage of night covers for display cabinets	❍		❍	❍		
Application of the FIFO / FEFO principle	❍		❍	❍		
Refrigeration						
Basic knowledge about refrigeration machinery including: - Refrigeration cycle - Air flow distribution in display cabinets - Defrosting requirements	❍		❍		❍	
Temperature Measurement on refrigeration machinery and cold store	❍		❍		❍	❍
Temperature Measurement and monitoring of proper operation of refrigerated display cabinets	❍		❍	❍		
Documentation						
Documentation including: - Temperature log - Waste log	❍		❍	❍	❍	❍
Emergencies						
Proper reaction in emergency situations including:						
- Breakdown of refrigeration system	❍		❍		❍	❍
- Breakdown of A/C system	❍		❍		❍	❍
- Temperature deviation of refrigerated display cabinets	❍		❍	❍		
- Temperature deviations before or after pre-cooling	❍				❍	❍
- Reporting in case of accidents, incidents, discrepancies	❍		❍		❍	❍
General						
HACCP requirements	❍		❍	❍	❍	❍