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Handbook 700

# Agricultural Export Transportation Handbook





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# Agricultural Export Transportation Handbook

by

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Web site: <http://www.ams.usda.gov/tmd/export/index.htm>

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This handbook provides a compilation of best industry practices, and its recommendations have been shown to be effective under normal conditions.

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## Introduction

The \$51.6 billion of U.S. agricultural exports in calendar year 2000 was \$3.1 billion more than in 1999, a 6.4-percent jump. This increase broke the 3-year string of annual declines that started in 1997. U.S. exports of high-value agricultural products accounted for \$2.2 billion or two-thirds of the export gain in 2000. Taking advantage of these growing export opportunities is not limited by company size. Many small to medium-size companies are successfully selling their products overseas.

Is your company ready to take advantage of these export opportunities? Have you developed an international marketing plan? Do you know which foreign market(s) hold the greatest potential and risk for your product(s) and have you located foreign customers? These are a few of the questions your company needs to answer before shipping product(s) overseas.

This publication provides you with a list of resources to help answer these questions. But mainly, the handbook looks at the transportation portion of the export process, that is, how to physically move agricultural products overseas with a focus on shipping high-value or value-added agricultural products. (Limited information on shipping bulk commodities is included.)

Many shippers rely simply on a freight forwarder, a travel agent for cargo, to handle all their transportation needs. The right freight forwarder is a valuable ally, but the shipper must also take an active role. It is the shipper's reputation and repeat sales that are on the line. By understanding who are the key players and their responsibilities, incoterms (international commercial terms), ocean and air cargo services, transport documentation, cargo insurance, methods of payment, and product handling, shippers can work with their freight forwarder to better ensure the success of their export venture.

This handbook provides an overview of an export shipment, highlighting what parties are involved and their responsibilities. It looks at the role of the freight forwarder, non-vessel operating common carrier, and customs broker. Incoterms, how to quote a price, and methods of payment are also covered as are ocean and air transportation. It explains the more common

documents used in export transportation and provides samples. It also explains the different types of cargo insurance, where to obtain it, and the procedures to follow when filing a claim. It offers guidelines for the safe transport of agricultural products to the overseas buyer, including tips on cooling, grading, packing, loading, storage, and the selection of transport equipment and mode of transportation. The sections on trade assistance and publications are included to provide shippers with other sources of information when the answer cannot be found within this text.

Our goal is to provide agricultural shippers with the information they need, in a concise, user-friendly format. We have also gone considerable lengths to ensure that the information in the publication is accurate. Should you discover information that is incorrect, we would appreciate hearing about it. Also, if you have any comments, suggestions for improvements, or additional information we should include, we would like to hear from you.

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<sup>1</sup>*Economic Research Service, Foreign Agricultural Trade of the United States (FATUS), p. 2, February 2000.*

## Overview

A typical export shipment from the United States involves approximately 40 steps that are carried out by 11 separate entities. The following is an outline of an export shipment going by sea using a confirmed irrevocable letter of credit as the method of payment. This is followed by a list of the entities involved and their individual responsibilities.

### ***Forty Steps of an Export Shipment***<sup>2</sup>

1. The buyer requests a quotation from the supplier/seller.
2. The seller responds by sending a pro forma invoice. The buyer uses the pro forma invoice to apply to its bank for a letter of credit.
3. The buyer/consignee's bank issues the letter of credit.
4. A purchase order and the letter of credit are sent to the shipper.
5. Shipper issues instructions to the freight forwarder for shipping the goods.
6. The freight forwarder books space with an ocean carrier (and inland carrier if requested by the shipper). When the booking is made, the carrier assigns a booking number to identify the shipment.
7. The freight forwarder prepares and submits a bill of lading master and a shipper's export declaration, which are sent to the ocean carrier.
8. The shipper's freight forwarder transmits the inland bill of lading and delivery instructions to the selected inland carrier, a truck, rail, or barge line.
9. The inland carrier picks up the cargo at the specified location and issues a cargo receipt to the shipper.
10. The cargo is delivered, along with a set of prepared dock receipts, to the out-bound pier terminal.
11. After taking delivery of the cargo, the outbound terminal gives a signed copy of the dock receipt to the inland carrier.
12. A copy of the dock receipt is also sent to the ocean carrier's office.
13. The ocean carrier's office matches the dock receipt with the booking number; it prepares a loading stowage plan.
14. The cargo is lifted aboard and stowed on the vessel, according to the stowage plan.
15. After the cargo has been loaded, the terminal sends the bills for stevedoring and wharfage to the outbound carrier's office.
16. The outbound carrier's office issues an ocean bill of lading with on-board certification, when required, to the shipper's freight forwarder. This bill of lading is a negotiable instrument and acts as title to the goods.
17. Upon receipt of the due bills from the outbound carrier's office, the shipper's freight forwarder pays the amounts due (if prepaid).
18. If the terms of sale indicate that the shipper is responsible for all transportation costs, and the shipper has not prepaid, then the freight forwarder collects payment from the shipper in exchange for the transportation documents.
19. The shipper submits a commercial set—the documents required for collection of payment as stated in the letter of credit—typically a negotiable bill of lading, an invoice and insurance certificate, and a customs invoice, if necessary—to the bank.
20. The bank carefully reviews the documents in the commercial set to guarantee that there are no discrepancies. After acceptance of the commercial set, the bank pays the shipper in accordance with the letter of credit issued by the buyer's bank.
21. The shipper's bank transmits the commercial set and a debit invoice to the consignee's bank.

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<sup>2</sup> Source: *Maersk SeaLand*



22. A non-negotiable copy of the bill of lading is sent to the consignee as notification that the cargo has been shipped.
23. After the vessel has sailed, the manifest, freight bills (if sent freight due), delivery receipts, container list, and arrival notice are sent to the carrier's overseas office.
24. Within 4 working days of the vessel's clearance, U.S. Customs receives a non-negotiable bill of lading copy with the shipper's export declaration.
25. Copies of the manifest are provided to the inbound pier terminal.
26. The consignee's bank releases the commercial set to the consignee against payment of the invoice amount.
27. Before the ship's arrival, the carrier's overseas office issues an arrival notice and invoice covering the ocean freight and other charges due if freight charges are for the buyer's account.
28. The buyer sends the commercial set, arrival notice and invoice, and forwarding instructions to its customs broker.
29. The customs broker presents the endorsed negotiable bill of lading to the inbound carrier's office as proof of title to the goods, and pays the ocean freight (if freight charges are for the buyer's account).
30. Upon receipt of freight due (if a collect shipment) and the negotiable bill of lading, the carrier releases the cargo to the customs broker.
31. At the same time, the carrier's office notifies the inbound pier terminal that the consignee's cargo may be released.
32. The consignee's customs broker submits to the local customs office the proper documents and duties due for clearance in accord with local regulations.
33. The customs office reviews the documents and may elect to inspect the shipment. Once it is satisfied that the shipment is in compliance with the laws, the customs office authorizes the release of the cargo to the customs broker.
34. In the case when the release is not effected at the berth, the customs office notifies its inspector at the inbound pier terminal that the cargo may be released.
35. The customs broker issues a delivery order to the inbound pier terminal authorizing delivery of the cargo to the designated inland carrier.
36. The consignee's customs broker issues an inland bill of lading to the selected inland carrier.
37. The inland carrier picks up the cargo at the inbound pier terminal.
38. The cargo is delivered to the buyer.
39. The inland carrier issues a freight bill to the consignee's customs broker.
40. With the shipment completed, the consignee's customs broker issues a bill to the consignee covering ocean freight, terminal charges (if these bills are charged to the buyer's account), inland freight, and fees for the customs broker's services.

The U. S. Department of Agriculture (USDA), AMS, Transportation and Marketing Programs (TMP), has produced a video, *A Business of Details—Exporting High Value U.S. Agricultural Products*, which follows an agricultural shipment from the farm to an overseas market. The video demonstrates the information covered in this section. (You can order a free copy of the video at: U.S. Department of Agriculture  
AMS, Transportation and Marketing  
Programs  
Transportation Services Branch Publications  
1400 Independence Avenue, SW  
Room 1217, South Building, or Stop 0267  
Washington, DC 20250-0267

### **Responsibilities**<sup>3</sup>

#### **Shippers**

- Contact freight forwarder with specifics of shipment including:
  - Number of packages
  - Marks and numbers
  - Description of cargo

<sup>3</sup> Source: *Maersk SeaLand, and the Port Authority of New York and New Jersey*

- Foreign destination
- Gross weight of each package shipped
- Foreign party to be notified
- Arrange inland freight \*
- Prepare inland bill of lading \*
- Prepare dock receipt \*
- Prepare packing list
- Mark cargo for:
  - Gross and net weight
  - Cubic measurement
  - Foreign destination
  - Identification marks
  - Country of origin
- Check documents prepared by freight forwarder for accuracy

\* Denotes tasks that can also be handled by the freight forwarder.

### ***Freight Forwarders***

- Arrange inland transportation \*\*
- Book space with steamship company or air carrier
- Prepare documents, including:
  - Inland bill of lading \*\*
  - Dock receipt \*\*
  - Ocean bill of lading/air waybill master
  - Consular invoice
  - Delivery order
  - Shipper's export declaration
- Pay the ocean freight charges
- Secure the original documents for the shipper

\*\* Denotes tasks that the shipper can also perform.

### ***Inland Carriers***

- Receive delivery instructions \*\*\*
- Pick up cargo from shipper
- Deliver cargo to export point
- Have dock receipt signed \*\*\*
- Notify exporter of arrival of cargo \*\*\*

\*\*\* This information can be supplied by either the shipper or the freight forwarder, whoever made the arrangements for inland transportation.

### ***Commercial Banks***

- Issue financial documents guaranteeing payment under specified terms and conditions

### ***Terminal Operators***

- Control truck traffic by issuance of pass to driver
- Check the delivery order or dock receipt
- Assign a checker for loading and unloading
- Stuff containers for breakbulk cargo
- Control parking of containers
- Assign stowage locations
- Coordinate movement of containers to the vessel
- Load and secure the vessel

### ***Ocean Carriers***

- Book cargo
- Dispatch containers
- Process the bill of lading
- Prepare:
  - Freight invoice
  - Manifest
  - Arrival notice
  - Delivery receipt
  - Stow plan
- File shippers export declaration (SED) with U.S. Customs
- Notify consignee of arrival and availability of cargo
- Arrange inland transportation when required

### ***Customs Inspectors***

- Check import documents
- Inspect cargo
- Control release of cargo
- Assess duties where required
- Complete the processing of import permits

### ***Customs Brokers***

- Prepare required customs entry and files with customs
- Effect customs release, freight release
- Coordinate with inland carrier for pickup of import cargo
- Verify information on bill of lading and prepare delivery orders
- Guarantee loading charges with terminal operator

### ***Conference Cargo Inspectors***

- Spot-check exported cargo against submitted documents
- Check against commodity description, weight, and cube

***Port Authorities***

- Quasi-governmental organizations responsible for the control and movement of vessels and cargo in and out of the port

***Insurance Surveyors***

- Survey cargo damage as requested by shipper or carrier

# Price Quotation

## Terms of Sale

Export terms of sale determine what costs are covered in the price of the cargo. They also indicate at what point ownership transfers to the buyer and at what point responsibility for the cargo transfers. International commercial terms (incoterms) provide “the international rules for the interpretation of trade terms.” The International Chamber of Commerce (ICC) publications *Incoterms 2000* and *GUIDE TO Incoterms 2000* are the latest publications covering all trade terms. The more commonly used trade terms are:

- **EXW (Ex Works...named point of origin)**—The price quoted applies only at the point of origin, and the seller agrees to place the goods at the buyer’s disposal at the specified place on the date or within the period fixed. All other charges are the responsibility of the buyer. EXW is sometimes referred to as Free on Board (FOB) ...packing house, warehouse, etc. Example: EXW Factory, EXW Warehouse, etc.
- **FAS (Free Alongside Ship...named port of shipment)**—Under this term, the seller quotes a price for goods that includes charges for delivery of the goods alongside a vessel at the port. The seller handles the cost of unloading and wharfage, loading, ocean transportation, and insurance costs are left to the buyer.
- **FOB (Free on Board...named port of shipment)**—Under this term, the seller quotes a price for goods that includes the cost of loading onto the transport vessel at the designated point. Ocean transportation and insurance are left to the buyer’s account.
- **CFR (Cost and Freight...named port of destination)**—For shipments to designated overseas port of import, the seller quotes a price for the goods that includes the cost of transportation to the named point of debarkation. The buyer is responsible for the cost of insurance, which is referred to as C & F in the old incoterms. The costs of unloading cargo at the port of destination are paid by the seller, to the extent that they are included in the freight charges. If the charges are separate, they fall to the the buyer.
- **CIF (Cost, Insurance, Freight)**—Under this term, for shipments to designated overseas port of import, the seller quotes a price for the goods, including insurance costs and all transportation and miscellaneous charges, to the point of debarkation from the vessel or aircraft. The costs of unloading cargo at

the port of destination are paid by the seller, to the extent that they are included in the freight charges. If the charges are separate, they fall to the account of the buyer.

The terms of sale dictate the point at which the title of goods transfer from the shipper to the consignee. Until such time as the title of the goods transfers from the shipper to the consignee, the shipper has a financial and an insurable interest in the safe arrival of the goods sold.

## Determining Price

To calculate the cost of the export product, first determine the total product cost by multiplying the cost per unit by the number of units. Then add the following:

- + Profit
- + Commissions
- + Banking fees
- + Palletization/export packing
- + Freight forwarding and documentation fees
- + USDA inspection and phytosanitary certificate fees
- + Other direct expenses related to special shipping requirements such as temperature recorder charges
- = **EXW price**
- + Inland transportation
- = **FAS price**
- + Terminal handling charges
- = **FOB price**
- + Ocean freight charges
- + Ancillary charges
- = **CFR price**
- + Insurance
- = **CIF price**

# Freight Forwarding

## International Freight Forwarder

The international freight forwarder plays an integral part in the transportation process. Freight forwarders act on behalf of the exporter in arranging transportation services. They are familiar with the import rules and regulations of foreign countries, methods of shipping, U.S. Government export regulations, and documents connected with foreign trade.

**Services**—Freight forwarders provide a number of services. During the initial planning phases, the freight forwarder can help decide:

- Which carriers to use
- The best days of the week to ship
- The best route
- The most economical shipment size

At the beginning of a sale, they can provide the exporter with a quotation on:

- Freight costs
- Port charges
- Consular fees
- Cost of special documentation
- Insurance costs
- Freight forwarder's fees

This information can be used in the preparation of an accurate price quotation to foreign customers. At the shipper's request, the freight forwarder can make the actual arrangements and provide the necessary services for expediting the shipment to its overseas destination. This can include:

- Booking space with the carrier
- Completing export documentation
- Arranging for cargo insurance
- Advising on foreign import regulations
- Providing guidance on packaging, marking, and labeling
- Arranging for products to be packed and containerized at the exporter's request

Some freight forwarders are also freight consolidators, but this is not a standard service.

**Cost**—Freight forwarders operate on a fee basis paid by the exporter. The forwarder's fees consist of an agreed upon amount, plus documentation charges.

The cost for their services should be figured into the price charged to the customer. Freight forwarders also collect a percentage of the freight costs from the carrier.

**Selection Criteria**—Every company has its own needs to consider when selecting a freight forwarder. The following list includes a few suggestions of criteria to consider:

- Is the freight forwarder licensed by the Federal Maritime Commission (FMC) to handle ocean cargo?

Currently, all ocean freight forwarders in the United States must be licensed by the FMC.

- Is the freight forwarder registered with the International Air Transport Association (IATA) to deal with international air cargo?

Being registered with IATA is not a requirement to handle air freight. However, to register, freight forwarders must meet IATA criteria regarding financial and credit standing, physical facilities, professional qualifications, and ethical practice.

- Is the freight forwarder financially stable?

Ask for credit references and check them. Ask carriers if the freight forwarder has a good payment record. Review a copy of the annual report. If it is a larger company you can check the New York Stock Exchange, NASDAQ, or Dun and Bradstreet.

- Does the freight forwarder have a record of customer satisfaction?

Ask the freight forwarder for a list of customers and call them.

- Does the freight forwarder have knowledge of and experience with your product, desired shipment method, and destination country?

Many companies feel that a freight forwarder experienced with moving their product, shipment method, and destination market will make a better partner. However, some freight forwarders feel that, although they do not have prior experience shipping a given

product or shipping to a specific destination, they could handle any move, anywhere.

- Does the freight forwarder have a network of overseas agents?

Does the freight forwarder have an office in your destination market? Are they agents or owned and operated offices? Do the offices have the ability to communicate with one another online?

- Is the forwarder large enough—with ample facilities—to handle your business?

Do they have warehouse facilities if that service is needed? Do they have electronic data interchange (EDI) capabilities? Do they have sufficient staff to handle your volume and other needs?

- Does the freight forwarder have “errors and omissions insurance”?
- Is the freight forwarder willing to take the time to explain terms and procedures in a way you can understand?

The Transportation Services Branch of TMP, USDA Agricultural Marketing Service, has compiled a directory of freight forwarders who handle a variety of agricultural products. Search at [www.ams.usda.gov/tmd/frieght/index.htm](http://www.ams.usda.gov/tmd/frieght/index.htm).

### **Non-Vessel Operating Common Carrier**

Smaller shippers, with less-than-containerload (LCL) shipments, can take advantage of the lower costs associated with being a big shipper. Non-vessel operating common carriers (NVOCCs) book space on steamships in large quantities at lower rates and sell space to shippers in smaller amounts. NVOCCs consolidate small shipments into containerloads that move under one bill of lading. More favorable rates are passed on to the shipper. Services typically offered by NVOCCs, in addition to customary services provided by freight forwarders, are:

- Consolidation of freight
- Financial liability for goods due to loss or damage

NVOCCs operate as a carrier and should be evaluated by applying the same service, price, and delivery standards.

### **Shippers' Association**

Shippers' associations operate in much the same way as NVOCCs. They are nonprofit associations that represent a number of shippers. The members pool their cargo to increase the volume of total shipments. The shippers' association can then book larger amounts of space on steamships at a lower rate than would be available to the individual shippers. Small and medium-size shippers have found shippers' associations to be a desirable way of achieving economies of scale in order to have more leverage when negotiating service contracts with ocean carriers. Since the enactment of the Ocean Shipping Reform Act (OSRA) in 1999, nearly 80 percent of all U.S. exports are reportedly moving under confidential service contracts, compared with around 20 percent before OSRA.

### **Customs Broker**

Customs brokers act on behalf of exporters and importers to clear goods through customs and deliver the items to the importer's warehouse. They are licensed and regulated by the U.S. Treasury Department. Importers may designate a particular customs broker. Some freight forwarders are also customs brokers.

## Ocean and Air Transportation

When transporting U.S. agricultural products overseas, the shipper ideally looks for the *fastest* and most *efficient* mode(s) of transportation that will deliver the shipment in perfect condition at the lowest possible cost. The actual selection will be a compromise among these factors. The mode(s) of transportation may be specified by the buyer or selected by a systematic approach in which the buyer's requirements, import regulations of the destination country, terms of sale, speed of delivery requirements, and destination and available routes determine the mode. Although most moves use a combination of transportation options—truck, rail, ocean, and air—the following is a look at ocean and air shipping options.

### Ocean Cargo

Ocean transportation takes longer than movements by air, but the cost of transportation is usually lower. There are three means of shipping products by ocean vessel—bulk, breakbulk, and containerized. The means you select depends on the type of cargo you are shipping and the size of the shipment.

**Bulk**—Bulk carriers haul full shiploads or full hulls of dry or liquid bulk cargoes such as grain, logs, fertilizer, and vegetable oil.

**Breakbulk**—Breakbulk cargo is loaded on and off a vessel by individual piece or bundle of cargo such as palletized cargo. Breakbulk ships can handle either dry or refrigerated cargo.

**Containerized**—Product is loaded into containers and moved from door to door without the contents being handled. Container vessels can handle both dry and refrigerated cargo. Containerized shipments are the most common mode of transportation for high-value or value-added agricultural exports.

Because this publication is geared toward the movement of high-value or value-added agricultural products, the remainder of this section on ocean cargo will look primarily at factors relating to containerized shipments.

**The Ocean Shipping Reform Act of 1998** – The FMC was established in 1961 as an independent government agency, responsible for the regulation of liner shipping in the foreign trades of the United States. On May 1, 1999, the FMC implemented OSRA, which

functions as a refinement to the Shipping Act of 1984. The main purpose of OSRA, as stated within the act, is to “amend the Shipping Act of 1984 to promote the growth and development of United States exports through competitive and efficient ocean transportation and by placing a greater reliance on the marketplace.”

The Shipping Act of 1984 was put into effect with the primary objective of regulating international ocean common carriers operating to or from U.S. shores. The ocean common carrier (or liner) industry is composed of domestic and foreign firms that operate vessels on regularly scheduled routes between the United States and foreign ports. Neither the scope of the 1984 Act nor OSRA includes maritime labor agreements, the carriage of goods on domestic waterways (cabotage), or maritime cargo preference programs.

Ocean carriers have been given limited antitrust immunity since 1916, and a primary function of the Shipping Act of 1984 was to grant continued antitrust immunity to ocean common carrier conferences. Carriers formulated conferences or agreements to fix rates, pool revenues, apportion markets, limit the volume or character of cargo transported, and control competition in international ocean shipping. Shippers could not challenge the formation of conference agreements, but the FMC could seek injunctive relief for any agreements that it considered to be substantially anticompetitive.

Although a variety of modifications did occur with the enactment of OSRA, what has not changed is carrier antitrust immunity. While carriers typically do not form conferences anymore, discussion agreements have been created in their place. Discussion agreements are composed of ocean carriers who create voluntary guidelines for themselves about items such as rates and surcharges. Carriers within a discussion agreement are not obligated to adhere to these specific guidelines; whereas, under the conference system, carriers were required to seek conference approval of service contracts before filing them. They were also required to obtain permission to offer a rate different from that filed by the conference. Under OSRA, discussion agreements often announce rate increases and new surcharges, but carriers are not obliged to adhere to them.

**Tariff**—In addition to antitrust provisions, OSRA modified the rules for filing ocean freight tariffs. Under the 1984 Act, every common carrier and conference had

to file its rates with the FMC. Called a tariff, the information filed included the rates, rules, and services offered by the carrier or conference. Under OSRA, this information does not have to be filed with the FMC but must be made available to the public through an automated tariff system. In addition to the base rate, carriers frequently include bunker fuel, currency adjustment, terminal handling, and port congestion surcharges in the tariff. However, five groups of commodities are exempt from tariff-filing requirements: bulk cargo, forest products, new assembled motor vehicles, recycled metal scrap, and wastepaper. Shipping lines can offer any rate they like, but if it differs from their published tariff, the company must file it with the FMC under a service contract (see below).

**Routes**—Ocean liners operate on regularly scheduled routes. There are a variety of publications, such as the *Pacific Shipper*, and Web sites, such as *The Journal of Commerce* [www.joc.com](http://www.joc.com) and [www.shipguide.com](http://www.shipguide.com), that list steamship companies, their routes, and departure and arrival dates.

**Charters**—In addition to regularly scheduled routes, chartered vessels can be contracted to haul full shiploads or full hulls of dry or liquid bulk cargoes such as grain, logs, fertilizer, and vegetable oil. Vessels can be chartered for individual trips or specified amounts of time. These charters are generally free from tariff-filing requirements.

**Rates**—Independent carriers set freight rates based on the commodity shipped and its value, weight, level of service provided, and destination. Sometimes several different rates are offered for the same commodity. For example, there may be one rate for shipping citrus and separate rates listed for oranges, grapefruit, etc. Separate rates may also be listed for intermodal shipments.

Freight rates are quoted in one of two ways: a basic rate plus ancillary charges or an all-inclusive rate.

**Basic Rate**—The basic rate is based on the commodity shipped. A basic rate can be based on the volume (quantity, size, and weight) of the shipment or per container, which has become the most common type of basic rate offered to shippers. Basic rates are also dependent upon where the shipment originates, its destination point, and whether the shipment moves in a refrigerated or nonrefrigerated container. Once the basic rate is established, ancillary charges are added to determine the total freight rate.

**Ancillary Charges**—Ancillary charges are often levied over and above the quoted freight rates. When applicable, these charges often include, but are not limited to:

- CAF—currency adjustment factors
- BAF—bunker fuel charges, also called fuel adjustment factor (FAF)
- THC—terminal handling charges
- Chassis surcharges
- Document surcharges (such as the bill of lading)
- Arbitrary charges, such port congestion surcharges and transshipment fees

Ancillary charges are stated in the tariff. Ancillary charges can be calculated as a percentage of the freight rate or a flat fee and can add up to more than 50 percent of the base freight rate.

**All-Inclusive Rate**—A single rate that incorporates all charges.

When obtaining a quote from a carrier, exporters or their freight forwarders should ask if any ancillary charges apply to the shipment. It is a good idea always to get quotes in writing.

Freight rates can be obtained directly from the steamship companies, freight forwarders, or NVOCCs or by visiting a tariff publishing Web site. These Web sites often require a paid subscription, but many steamship companies publish their own tariffs online, which can be obtained at no cost.

TSB produces a quarterly *Ocean Freight Rate Bulletin* that tracks high-value, containerized agricultural shipments to various international markets. The publication provides a side-by-side comparison of the rates and services provided for each commodity that was exported during the preceding months. Commodities tracked by the *Bulletin* include: apples, grapes, grapefruit, oranges, almonds, raisins, pistachios, frozen beef, frozen poultry, lentils, onions, wine, animal feed, soybeans, and lettuce. To obtain a copy, contact TSB at Room 1203 South Building, 1400 Independence Avenue, SW, Washington, DC 20250 or visit the Web site at: [www.ams.usda.gov/tmd/ocean](http://www.ams.usda.gov/tmd/ocean).

**Containers**—Typically, modern liner carriers operate containerships that are designed to transport cargo stowed in 20-, 40-, or 45-foot ocean-shipping containers. The use of containers reduces many risks associated with moving a product, such as adverse temperatures, handling damage, and theft. The most common



container sizes are 20-foot equivalent units (TEU) and 40-foot equivalent units (FEU). Table 1 at the end of this section lists some of the common ocean-container dimensions. Each carrier's equipment is slightly different in size, so check on the exact dimensions of the equipment you will use when placing a booking.

**Service Contracts**—OSRA also amended a form of ocean freight contractual agreement called service contracts. A service contract is an agreement between a shipper and carrier in which the shipper commits a specified volume or minimum percentage of cargo over a fixed period of time in exchange for carrier rate concessions and specific service obligations. The essential terms of the contract must be filed confidentially with the FMC. Since shippers and ocean carriers are now able to keep service contracts confidential (under the 1984 Act, contracts were made public), the option of shipping under a contract has become more appealing to shippers. The industry is estimating that nearly 80 percent of all shipments are currently being moved under contract; whereas, before OSRA, only about 20 percent of U.S. trade was shipped under contract.

**Negotiating Skills**—Obtaining a lower freight rate is not the only incentive for negotiating with a carrier or conference. Equally important to many shippers is the level of customer service and dependability. When entering into negotiations the shipper should:

- Know the points of origin and destination, volume, frequency, mandatory arrival dates, and special requirements of the shipments.
- Clearly define the service goals and transportation needs, including equipment interchange, transit times, and delivery requirements.
- Determine selection criteria based on shipment needs and goals.
- Select potential carriers, both U.S.-flag and foreign-flag, based on geographic areas or routes, service, sailing schedules, and price.
- Estimate the cost of transportation the company can afford to pay based on the overseas price, deducting all costs not related to overseas transportation. This information can be used as leverage in the negotiations.
- Prepare a comprehensive bid package including volume and flow information.
- Analyze carrier bids based on established criteria.
- Establish a system to evaluate performance. If there is evidence of poor performances, a negotiator should approach long-term contractors with com-

ments, suggestions, or problems that they may be able to solve.

**Complaints**—Ocean common carriers are prohibited from engaging “in any unfair or unjustly discriminatory practice in the manner of rates.” Upon its own motion or the filing of a complaint, the FMC will investigate discriminatory, unfair, or unreasonable rates, charges, classifications, and practices of ocean common carriers, terminal operators, and freight forwarders operating in the foreign commerce of the United States. While concerned primarily with the enforcement of the various statutes within its jurisdiction, the FMC also offers users of shipping services assistance in resolving their problems with carriers, cruise operators, and other industry entities, such as interceding with carriers and providing advice and information to shippers.

Complaints or problems regarding rates, services, or tariffs should be directed to the FMC. The Act prohibits a number of practices. Common carriers are prohibited from rebating, offering unreasonable preference to any shipper, employing “fighting ships” to drive off competitive carriers, or engaging in predatory practices. Shippers are prohibited from demanding rates not listed in the tariffs or providing false information regarding the weight or contents of cargo shipments. One of the FMC's primary responsibilities is to investigate potential infractions of these and other provisions of the Act, and assess penalties for violations. One of the most common infractions has been rebating.

Questions regarding the application of the Shipping Act of 1984, OSRA, service contracts, tariffs, or potential violations of the act can be directed to the Federal Maritime Commission in Washington, DC at (202) 523-0300, or to the following FMC district offices:

Los Angeles	(310) 514-4905
Miami	(305) 536-4316
New Orleans	(504) 589-6662
New York	(212) 637-2929
Seattle	(206) 533-0221

Agricultural shippers can also contact USDA-AMS-TMP-TSB at (202) 690-1304 regarding questions or problems with ocean liner shipping.

As part of its role to study the effects of OSRA on the shipping industry, the FMC conducted a survey in 2001. Shippers, liner carriers, and ocean transportation intermediaries and other interested parties were able to respond. In general, feedback was positive, but

many shippers argue that antitrust immunity is contrary to the purpose of OSRA and that it does not encourage market-based pricing or a truly competitive shipping market. Agricultural shippers are especially concerned with the continued antitrust immunity because, for some agricultural commodities, ocean freight accounts for as much as 50 percent of total landed cost of the shipment.

In response to increased pressure from most agricultural and other shippers, a bill has been drafted to further amend the Shipping Act of 1984. The bill would remove vessel operators' exemption from antitrust laws. The outcome of passing such a bill could have a significant impact on the shipping industry.

### **Harbor Maintenance Fee<sup>4</sup> (HMF)**

**Summary**—Since 1987, the U.S. Customs Service has assessed a Harbor Maintenance Fee (HMF) on all imports and exports. This tax, .125 percent of the value of the shipment, is collected for the Harbor Maintenance Trust Fund, which is used for dredging the Nation's deep draft harbors and navigation channels. On October 25, 1995, the Court of International Trade (CIT) declared the HMF unconstitutional for exports. Therefore, the HMF is collected only on imports and domestic movements. Refunds of fees collected for exports have been paid, covering the period from July 1990 forward.

For background information about the HMF and for the procedures for refunds of harbor maintenance fees on exports, contact the U.S. Customs Service at: Regulations Branch, Office of Regulations and Rulings, U.S. Customs Service, 1300 Pennsylvania Avenue, NW, 3d Floor, Washington, DC 20229; telephone: (317) 298-1200 (ext. 4003); or visit their Web site at: <http://www.customs.gov/impoexpo/hmf.htm>.

### **Air Cargo**

For agricultural products with relatively short shelf lives, such as fresh asparagus, strawberries, and cherries, time in transit is the critical factor in determining which transportation method is used. Air shipment of these products is often used due to the fast in-transit time. However, the cost for moving product by air tends to be higher than the cost of ocean transportation.

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<sup>4</sup>The technical information on the Harbor Maintenance Fee was provided by the Agricultural Ocean Transportation Coalition (AgOTC).

Air cargo moves in one of three ways: in combination passenger/cargo flights, all cargo flights, or charters. Both passenger/cargo and all cargo flights have scheduled flight times and destinations.

Shippers also have the option of chartering a plane to carry their cargo. Charters are essentially aircraft for hire, with no preset schedules and destinations. Sometimes a freight forwarder or group of freight forwarders will charter planes offering space to their shippers at a special rate. This is known as a split charter or forwarder charter and is authorized in many markets.

International air carriers have antitrust immunity to establish "fixed" rates. A group of air carriers that have jointly agreed on a fixed rate are known as International Air Transport Association (IATA) conferences. These fixed tariffs represent the maximum amount that airlines can charge for air cargo. Airlines are free to charge lower rates than the agreed-upon maximum.

**Tariff**—Tariffs define the rates, rules, and regulations associated with air cargo on a given carrier. Tariffs define the "product" offered by the airlines. For example, does the price include airport-to-airport delivery or door-to-door delivery? Does it include customs clearance? What is the carrier's liability? The rules section of the tariff also specifies the shipper's responsibilities, such as payment method, restrictions, and packing and marking requirements. Check with your freight forwarder or airline to obtain tariff information.

**Schedules**—Air carriers operate regularly scheduled flights. Schedule information can be obtained directly from the air carriers, freight forwarder, and such publications as the Official Airline Guides Air Cargo Guide (OAG).

**Booking Space with the Airlines**—When booking space with an airline, the shipper or shipper's freight forwarder needs to supply the following information:

- Air waybill number
- Total number of packages to be shipped
- Weight of the entire shipment
- Dimension and volume of the shipment
- Nature of goods being shipped (e.g., perishable foodstuffs, dry ice, live animals, etc.)
- Airport of departure
- Airport of destination
- Requested route

Also, any special considerations must be mentioned during the booking. Special considerations include temperature and other requirements for perishables, live animals, restricted cargo, etc.

A cargo booking with an airline means that your cargo will move from the airport of departure to the airport of destination. It does not guarantee that this will happen on a specific flight, following an identified route, in a specified time period. Airlines do not guarantee a fixed arrival time for cargo and can change transportation arrangements at anytime without notice.

**Rates**—Freight rates vary depending on the commodity being shipped, its value, level of service provided, destination, weight, and seasonal variations in demand for cargo space.

The weight of a shipment is calculated on either the actual weight (in kilograms), the dimensional weight (length x width x height), or the positional weight, whichever is greater.

Air freight forwarders and air carriers are the best sources for obtaining freight rates. There are also companies that specialize in publishing air cargo tariffs. These publishing companies charge a fee for their services.

**Containers**—When sending multiple boxes or pieces of cargo to one destination, cargo is loaded into an aircraft container or assembled and secured on an aircraft pallet. Both the aircraft container and pallet are called a unit load device (ULD). ULDs enable cargo to be assembled into a standard sized unit for rapid loading and unloading. ULDs also help to cut down on split shipments and lost cargo. Containers of different size and dimensions are available for shipper use from the airlines. Table 2 at the end of this section provides a description of standard ULDs.

**Negotiations**—The air cargo industry is intensely competitive, and air carriers are sometimes willing to negotiate with shippers to get their business. The key to getting the best rate and/or level of service is to shop around. With a knowledge of the level of service and rates being offered, many shippers can enter into private negotiations with carriers.

**Hazardous Materials**—The U.S. Code of Federal Regulations, Title 49, contains explicit regulations that list and define restricted articles, noting which may or may not be carried, quantities allowed, and proper

shipper certification, packing, marking, labeling, and handling. Dry ice transforms from a solid to gaseous carbon dioxide, displacing oxygen in enclosed spaces. When shipped by air as a refrigerant for perishable commodities dry ice is considered a dangerous commodity and regulated by the U.S. Department of Transportation and IATA. Carrier instructions must be followed and appropriate information placed on the air waybill and packaging.

**Table 1: Container Specifications**

EQUIPMENT	INTERIOR DIMENSIONS	DOOR OPENING	TARE WEIGHT	CUBIC CAPACITY	PAYLOAD
45' High Cube Container	L: 13.582 m 44' 6 1/2" W: 2.347 m 7' 8 1/4" H: 2.690 m 8' 10"	W: 2.340 m 7' 8" H: 2.584 m 8' 5 3/4"	4,110 kg 9,061 lb	85.7 m <sup>3</sup> 3,026 ft <sup>3</sup>	28,390 kg 62,589 lb
40' High Cube Container	L: 12.056 m 39' 6 1/2" W: 2.347 m 7' 8 1/4" H: 2.684 m 8' 9 1/2"	W: 2.340 m 7' 8" H: 2.585 m 8' 5 3/4"	2,900 kg 6,393 lb	76.0 m <sup>3</sup> 2,684 ft <sup>3</sup>	29,600 kg 65,256 lb
40' Dry Freight Container	L: 12.051 m 39' 6 1/2" W: 2.340 m 7' 8" H: 2.380 m 7' 9 1/2"	W: 2.286 m 7' 6" H: 2.278 m 7' 5 1/2"	3,084 kg 6,799 lb	67.3 m <sup>3</sup> 2,377 ft <sup>3</sup>	27,397 kg 60,401 lb
20' Dry Freight Container	L: 5.919 m 19' 5" W: 2.340 m 7' 8" H: 2.380 m 7' 9 1/2"	W: 2.286 m 7' 6" H: 2.278 m 7' 5 1/2"	1,900 kg 4,189 lb	33.0 m <sup>3</sup> 1,165 ft <sup>3</sup>	22,100 kg 48,721 lb
45' High Cube Reefer Container	L: 13.102 m 39' 6" W: 2.294 m 7' 6 5/16" H: 2.509 m 8' 2 3/4"	W: 2.467 m 8' 1 1/8" H: 2.290 m 7' 6 1/8"	5,200 kg 11,464 lb	75.4 m <sup>3</sup> 2,663 ft <sup>3</sup>	27,300 kg 60,186 lb
40' High Cube Reefer Container	L: 11.775 m 37' 11" W: 2.286 m 7' 6" H: 2.491 m 8' 2"	W: 2.286 m 7' 6" H: 2.454 m 8' 1/2"	4,320 kg 9,524 lb	65.8 m <sup>3</sup> 2,324 ft <sup>3</sup>	28,180 kg 62,126 lb
40' Reefer Container	L: 11.207 m 36' 9" W: 2.246 m 7' 4" H: 2.183 m 7' 2"	W: 2.216 m 7' 3" H: 2.183 m 7' 2"	4,600 kg 10,141 lb	54.9 m <sup>3</sup> 1,940 ft <sup>3</sup>	25,881 kg 57,059 lb

Source: *Maersk SeaLand*

**Table 2: Containers Provided by Airlines**

These containers are owned by the airlines and are certified as an integral part of the aircraft. These units are available from the carrier for shipper use. The specifications may vary slightly by owner. This information is provided as a guide only.

<p>TYPE: A1 Dom./SAB-UAB Intl.</p> <p>Int. Capacity: 393 ft<sup>3</sup>            Ext. Dim.: 88 by 125 by 87 in            Max. Gross Weight: 13,300 lb            Cube Displacement: 425 ft<sup>3</sup></p>	<p>TYPE: LD6 Dom./AWC-AWF Intl.</p> <p>Int. Capacity: 316 ft<sup>3</sup>            Ext. Dim.: 25 by 60.4 by 64 in            Max. Gross Weight: 5,680 lb            Cube Displacement: 339 ft<sup>3</sup></p>
<p>TYPE: A2, A3 Dom./AAA-SAA Intl.</p> <p>Int. Capacity: 440 ft<sup>3</sup>            Ext. Dim.: 88 by 125 by 87 in            Max. Gross Weight: 12,500 lb            Cube Displacement: 475 ft<sup>3</sup></p>	<p>TYPE: LD7, LD9 Dom./AAP-AAR Intl.</p> <p>Int. Capacity: 355 ft<sup>3</sup>            Ext. Dim.: 125 by 88 by 64 in            Max. Gross Weight: 13,300 lb            Cube Displacement: 401 ft<sup>3</sup></p>
<p>TYPE: FTC Dom./=</p> <p>Int. Capacity: 151 ft<sup>3</sup>            Ext. Dim.: 81 by 60.4 by 62.75 in            Max. Gross Weight: 4,500 lb            Cube Displacement: 174.5 ft<sup>3</sup></p>	<p>TYPE: LD8 Dom./ALE Intl.</p> <p>Int. Capacity: 253 ft<sup>3</sup>            Ext. Dim.: 196 by 60.4 by 60 in            Max. Gross Weight: 5,400 lb            Cube Displacement: 280 ft<sup>3</sup></p>
<p>TYPE: LD2 Dom./APA Intl.</p> <p>Int. Capacity: 120 ft<sup>3</sup>            Ext. Dim.: 47 by 60.4 by 64 in            Max. Gross Weight: 2,700 lb            Cube Displacement: 134 ft<sup>3</sup></p>	<p>TYPE: LD10 Dom./AWR-AWS Intl.</p> <p>Int. Capacity: 246 ft<sup>3</sup>            Ext. Dim.: 125 by 60.4 by 64 in            Max. Gross Weight: 5,680 lb            Cube Displacement: 76 ft<sup>3</sup></p>
<p>TYPE: LD3 Dom./AVE-AKE Intl.</p> <p>Int. Capacity: 150 ft<sup>3</sup>            Ext. Dim.: 79 by 60.4 by 64 in            Max. Gross Weight: 3,500 lb            Cube Displacement: 166 ft<sup>3</sup></p>	<p>TYPE: LDW Dom./=</p> <p>Int. Capacity: 70 ft<sup>3</sup>            Ext. Dim.: 98 by 42.2 by 41.6 in            Max. Gross Weight: 1,700 lb            Cube Displacement: 76 ft<sup>3</sup></p>
<p>TYPE: LD4 Dom./DLP-DLF Intl.</p> <p>Int. Capacity: 193 ft<sup>3</sup>            Ext. Dim.: 96 by 60.4 by 64 in            Max. Gross Weight: 5,400 lb            Cube Displacement: 215 ft<sup>3</sup></p>	<p>TYPE: M1 Dom./ARA Intl.</p> <p>Int. Capacity: 572 ft<sup>3</sup>            Ext. Dim.: 125 by 96 by 96 in            Max. Gross Weight: 15,000 lb            Cube Displacement: 666 ft<sup>3</sup></p>
<p>TYPE: LD5, LD11 Dom./AWB-AWD Intl.</p> <p>Int. Capacity: 265 ft<sup>3</sup>            Ext. Dim.: 125 by 60 by 64 in            Max. Gross Weight: 7,000 lb            Cube Displacement: 265 ft<sup>3</sup></p>	<p>TYPE: M2 Dom./ASE-ASG Intl.</p> <p>Int. Capacity: 1077 ft<sup>3</sup>            Ext. Dim.: 240 by 96 by 96 in            Max. Gross Weight: 25,000 lb            Cube Displacement: 1,286 ft<sup>3</sup></p>

Source: *Air Cargo from A to Z*

## Transport Documentation

The average international shipment involves 46 separate documents. The specific documents required for any given shipment depend on U.S. Government regulations, destination country's import regulations, importer's requirements, terms of sale, method of payment, and mode of transportation.

**U.S. Export Requirements**—The U.S. Government requires export documentation for a number of different reasons including national security, control of products in short supply, compiling export statistics, administration of export laws, protection of endangered species, and to protect U.S. export markets by ensuring product quality of specific exports. The main document required by the U.S. government is the Shipper's Export Declaration (SED).

**Importing Country Requirements**—Each country has different requirements regarding the documentation that accompanies any given import shipment. Importing countries require these documents for the administration of their import laws, assessment of taxes, and protection from hazardous pests and diseases. Some of the more frequently required documents are: commercial invoice, bill of lading, phytosanitary certificate (for plants or plant products), veterinary health certificate (for animals or animal products), packing list, and certificate of origin.

Other import regulations that may affect a shipment are packaging and labeling requirements and recycling laws.

**Importer's Requirements**—Buyers/importers may require documents in addition to the documents required by their governments. Importers may need a specific document in order to receive an import permit from their governments or to obtain financing from their financial institutions. Possible documents requested are: pro forma invoice, inspection certificate for grade and condition, or a statement of processing methodology (depending on the level of processing involved).

**Additional Documents**—Additional documents are required based on the terms of sale, method of payment, and transportation mode. These documents could include a letter of credit, shipper's letter of instruction, certificate of insurance, dock receipt, bill of lading, and air waybill.

Although only the most common documentation requirements will be addressed here, exporters must know all regulations that apply to their shipments.

An experienced freight forwarder can assist exporters in determining what documents are required and can complete much of the documentation on the shipper's behalf. Additional sources for determining documentation requirements for any given shipment are: importer, bank, destination country's consulate, and USDA's Foreign Agricultural Service (FAS), Animal and Plant Health Inspection Service (APHIS), and Food Safety and Inspection Service (FSIS). Publications such as the *Official Export Guide*, Bureau of National Affairs' *International Trade Reporter-Export Reference Manual*, and Dun's & Bradstreet *Exporters' Encyclopaedia* also provide this type of information.

Slight discrepancies or omissions in documentation may prevent goods from being exported, may result in the shipper's not getting paid, or may result in delays at the port and seizure of the goods by U.S. or foreign customs agents. Completion of much of the documentation is routine for freight forwarders or customs brokers, but the exporter is ultimately responsible for the accuracy of the documentation.

This section looks at the most commonly required documents and includes sample documents.

### Pro Forma Invoice

Export transactions, particularly first-time transactions, may begin with an inquiry from abroad, followed by a request for a quotation or a pro forma invoice. The pro forma invoice is essentially a quotation in an invoice format. It is a form the buyer uses when applying for an import license or arranging for funds.

The following information should be included on the pro forma invoice:

- Seller's name, address, phone, fax, and e-mail address
- Buyer's name, address, phone, fax and e-mail address
- Buyer's reference number and date of inquiry
- Listing of requested products and brief description
- Price of each item (preferably to quote in U.S. dollars in order to reduce foreign exchange risk)

- Whether the product is new or used
- Gross and net shipping weight (in metric units where appropriate)
- Total cubic volume and dimensions (in metric units where appropriate) when packed for export
- Trade discount (if applicable)
- Delivery point
- Terms of payment
- Insurance and shipping costs
- Validity period for quotation
- Total charges to be paid by customer
- Estimated shipping date from factory to U.S. port (it is preferable to give U.S. port)
- Estimated date of shipment arrival

In addition to the preceding items, a pro forma invoice should include a statement certifying that the invoice is true and correct and a statement naming the country of origin of the goods. The invoice also should be conspicuously marked “pro forma invoice.”

Quotations should state explicitly that they are subject to change without notice. If a specific price has been agreed upon or guaranteed by the exporter, and must be upheld in the quotation, the precise period during which the offer remains valid should be specified.

### **Commercial Invoice**

The commercial invoice is a bill for the goods. The buyer needs the invoice to prove ownership and to arrange payment. Some governments use the commercial invoice to assess customs duties. Although there is no standard form for a commercial invoice, the following information should be included:

- Seller’s name and address
- Buyer’s name and address
- Exact description of goods (kind, grade, quality, weight)
- Agreed-upon price (preferably in U.S. dollars in order to reduce foreign exchange risk)
- Type of container
- Description of packages (number, kind, markings)
- Delivery point
- Terms of payment
- Date and place of shipment
- Method of shipment
- Signature of shipper/seller

### **Inspection Certificates**

Agricultural exporters are frequently required to provide a certificate attesting to the condition of the goods shipped. Depending on the product, certifying officials will inspect agricultural exports for specific insects and diseases, wholesomeness, and grade and condition, and issue certificates attesting to the product’s condition at the time of inspection. Contact information for the agencies that conduct these inspections is included in the Export Advice and Assistance section of this publication. Included among these certificates are:

***Phytosanitary Certificate***—The purpose of the Phytosanitary Certificate, Plant Protection and Quarantine (PPQ) Form 577, is to expedite the entry of plants or plant products into a foreign country. This certificate certifies to a foreign country that the plants or plant products described have been inspected according to appropriate procedures and are considered to be free from quarantine pests and other injurious pests and that they are considered to conform with the current phytosanitary regulation of the importing country. This certificate is issued by a certifying official (Federal, State, or local).

***Export Certificate-Processed Plant Products***—The export certificate for processed plant products, PPQ form 578, was created for processed plant products that cannot be given a phytosanitary certificate but have been denied entry to one or more countries because no certification process existed. This certificate certifies to a foreign country that, based upon inspection of submitted samples and/or by virtue of processing received, the plants products described above are believed to be free from injurious plant pests. Examples of products that fall under this category are:

1. Meal extracted from seeds by solvent
2. Bulk newsprint derived from wood pulp
3. Nuts in bulk that are salted, roasted, or vacuum-packed (in or out of their shells)
4. Oilseed cake of any kind
5. Pelletized plant material
6. Soy-fortified products
7. Soy protein, isolated
8. Thread waste from cotton milling
9. Wood products, molding, pressure-treated lumber, particle board, plywood, timber impregnated with creosote, tongue-in-groove flooring, paneling, ceiling, veneer, and furniture parts, either sanded or unsanded

The processed product certificate is also completed by APHIS.

**Federal-State Inspection Certificate-Export Apple Act**—Apples exported from the United States must meet minimum quality and other requirements established by the Export Apple Act. This act also requires that USDA, through a Federal or Federal-State inspection service, officially inspect and certify these apples as being in compliance with the regulations. The Fruit and Vegetable Programs of the USDA Agricultural Marketing Service administers the Act.

**Federal-State Inspection Certificate-Export Grape and Plum Act**—Vinifera grapes exported from the United States must meet minimum quality and other requirements established by the Export Grape and Plum Act. Export shipments of vinifera grapes must be inspected and certified by a Federal or Federal-State inspection service. Exports of plums are not currently regulated under the Act since other regulations already restrict exports of plums to better grades and sizes. The Fruit and Vegetable Programs of the USDA Agricultural Marketing Service administers the Act.

**Voluntary Food Quality Certification**—USDA-AMS offers, for a fee, a voluntary food quality certification service. Quality certificates are offered by the Dairy Programs, Fruit and Vegetable Programs (for both fresh and processed products), Livestock and Seed Programs, and Poultry Programs.

**Contract Certification**—For a fee, AMS will review contracts and work with exporters to develop a written specification for the quality certification of food products.

**Meat and Poultry Export Certificate of Wholesomeness**—USDA's Food Safety and Inspection Service (FSIS) inspectors, located in U.S.-based, Government-approved processing/slaughter facilities, issue the Meat and Poultry Export Certificate of Wholesomeness, FSIS Form 9060-5. This certificate certifies that all meat and meat products for human consumption are safe, wholesome, and accurately labeled to meet both the U.S. standards and the receiving country's import requirements. Additional export certificates issued by FSIS include the Horsemeat Export Certificate, Inedible Product Export Certificate, and Animal Casings Export Certificate.

**Veterinary Health Certificate**—USDA's Veterinary Services, a division in APHIS, inspects animals and

animal by-products and provides certification that the specific health requirements of the importing country have been met.

**Organic Certification**—With implementation of national organic standards and accreditation of private and State certifiers, foreign buyers will look to USDA for assurances that the products are produced organically. All producers and handler/processors wishing to label their products as organic must have their production and handling systems certified by USDA-accredited certifiers. These certifiers will also be able to verify that any organic products meet specific additional requirements of foreign buyers. All imported organic products must be produced and certified under systems that are equivalent to the U.S. standards as determined by USDA. This includes imported products that may become ingredients in processed products for export from the United States. More information on The National Organic Program is available at <http://www.ams.usda.gov/nop/>.

**Other Certification Programs**—USDA-AMS' Science and Technology Division (STD) provides export certification services. STD laboratories test for *Salmonella enteritidis* in poultry products intended for export to South Africa. They also test honey, dry whole milk, and butteroil, and certify that they meet the requirements of the importing countries. STD tests soybeans intended for export to Japan for pesticide residues.

In addition to the USDA agencies listed above, the Grain Inspection, Packers, and Stockyards Administration (GIPSA) inspects grain shipments to ensure that they meet contract specifications. Contact information for the USDA agencies that provide these inspection services are listed in the Trade Assistance section of this handbook.

### **Weight Certification**

The Intermodal Safe Container Act of 1992 was enacted to attempt to reduce the number of overweight loads on the Nation's highways. This legislation will affect all agricultural importers and exporters. Effective April 6, 1997, shippers are required to provide weight certifications for intermodal movements of containers or trailers. Shippers are required to provide accurate and complete information to the intermodal carrier, and the carrier will be responsible for transmitting this information to any subsequent carrier.



The following is a brief summary of the requirements, liability, and penalties.

**Certification Requirements**—All cargoes that are either loaded into trailers or ocean shipping containers that are part of an intermodal movement, that will travel by motor carrier on a U.S. public highway, and weigh more than 29,000 pounds will require certification.

The certificate must include:

- The identification number of the container or trailer.
- The actual gross weight, including all packaging material and pallets.
- A general description of the contents. Shippers should note that the FAK (Freight of all Kinds) cargo designation will not be acceptable after December 31, 2000, for shipments where any one commodity equals or exceeds 20 percent of the total weight. The certificate should note if the cargo is perishable or likely to shift in transit.
- The identity of the certifying party. No signature is required.
- The date of certification.

Prior to tendering the cargo, the shipper must notify the carrier, either by telephone or electronic transmission, of the gross cargo weight and a general description of the cargo.

The certificate may be incorporated into other shipping documents as long as the document contains all required information. The date of transfer of the certificate, and the identity of the party performing the transfer, must be noted on the document. If a separate document is used, it must be conspicuously marked as "Intermodal Certification."

Each carrier transporting the cargo in the intermodal chain is responsible for forwarding the certification to the next carrier. If no certification is received by the subsequent carrier before, or when, the container or trailer is tendered, the subsequent carrier may presume that no certification is required.

**Liability**—The party tendering the cargo is liable for any false information on the certificate and for failure to provide a certificate. The party transferring the certification data is liable for inaccurately transferred data. The carrier is liable for failure to forward the certificate to the subsequent carrier.

**Exceptions**—Notification and certification requirements do not apply to intermodal containers or trailers

containing consolidated shipments loaded by a motor carrier who performs the highway portion of the movement or assumes responsibility for weight-related penalties for any other motor carrier.

**Penalties**—Federal law provides for penalties ranging from \$500 to \$1,000 per count for violations of the certification requirements. Violations of the act include: improper weight certification, failure to provide certification, failure to forward certification, inaccurate transfer of certification data. Failure to pay fines may result in a lien against the cargo until payment is received, but lien provisions do not apply to perishable agricultural commodities. Shippers should also note that highway weight requirements for State (non-Federal) roads may vary, and they should ensure that intermodal movements meet all local standards.

**Contact**—For further information regarding weight certification requirements, contact the Federal Highway Administration in Washington, DC, (202) 366-0650.

### **Packing List**

The export packing list is considerably more detailed and informative than a standard domestic packing list. An export packing list itemizes the material in each individual package and indicates the type of package—box, crate, drum, carton, etc. It shows the individual net, legal, tare and gross weights, and measurements for each package (in both imperial and metric units).

- Net weight—Weight of the goods not including packaging.
- Legal weight—Weight of product plus paper, box, bottle, etc., contains the article as usually carried in stock.
- Tare weight—Weight of packaging or weight of shipping container.
- Gross weight—Weight of goods and packaging.

Package markings should be shown along with the shipper's and buyer's references. The packing list should either be included in or attached to the outside of a package in a waterproof envelope marked "packing list enclosed." The list is used by the shipper or forwarding agent to ascertain the total shipment weight and volume in addition to determining whether the correct cargo is being shipped. In addition, customs officials (both U.S. and foreign) may use the list to check the cargo and assess import duties.

## Shipper's Letter of Instruction

This document is completed by the shipper and includes all information necessary for the freight forwarder or carrier to make transportation arrangements and complete the bill of lading and other related documents. The shipper's letter of instruction should include:

- Shipper's company name, address, phone, fax, and contact name
- Shipper employee identification number
- Shipper reference numbers (bill of lading, invoice, purchase order, etc.)
- Product information (description of goods, product quantity, number of packages, weight in pounds, cubic feet, marks)
- Consignee information
- Notify party
- Product invoice value
- Harmonized commodity code
- Freight and documentation billing information
- Special instructions
- Signature and date

## Dock Receipt

The dock receipt is used to transfer accountability when the export item is moved by the domestic carrier to the port of embarkation and left with the international carrier for export. There is no standard format for a dock receipt, but it should include a description of shipment and shipping information. This document is traditionally produced by the exporter or the exporter's freight forwarder and is signed by the receiving clerk for the carrier. With more and more ports utilizing electronic data interchange (EDI), this document is being transmitted electronically.

## Certificate of Origin

Certain nations require a signed statement as to the origin of the export item. The certificate is usually obtained through a semi-official organization, such as a local Chamber of Commerce. It may be required even though the commercial invoice contains the information.

## Consular Invoice

A consular invoice for imported goods may be required by certain nations. It is used as a means to control and identify imported goods. The invoice must be pur-

chased from the consulate of the country where the goods are being shipped and usually must be prepared in the language of that country.

## Insurance Certificate

If the seller is responsible for providing insurance, the insurance certificate should state the type and amount of coverage. This is a negotiable instrument.

## Automated Export System

The Automated Export System (AES) is a joint venture between the U.S. Customs Service, the Foreign Trade Division of the Bureau of the Census (U.S. Department of Commerce), the Bureau of Export Administration (U.S. Department of Commerce), the Office of Defense Trade Controls (U.S. Department of State), other Federal agencies, and the export trade community. It is the central point through which export shipment data required by multiple agencies are filed electronically to Customs, using the efficiencies of Electronic Data Interchange (EDI). AES provides an alternative to filing paper Shipper's Export Declarations (SED). Export information is collected electronically and edited immediately, and errors are detected and corrected at the time of filing. AES is a nationwide system operational at all ports and for all methods of transportation. It was designed to assure compliance with and enforcement of laws relating to exporting, improve trade statistics, reduce duplicate reporting to multiple agencies, and improve customer service. For more information on export reporting, visit [www.customs.gov/aes](http://www.customs.gov/aes) or [www.aesdirect.gov](http://www.aesdirect.gov) or call the Census Bureau toll-free at (800) 549-0595.

## Export Licensing

An export license may be required for filling out the shipper's export declaration. Determining which export authorization to use may appear complex. But in most cases, it is a straightforward process.

There are two types of export authorization: export license and license exception. Licenses are given for transactions, not for individuals or companies. Ninety-five percent of products exported from the United States do not require an export license.

To comply with export licensing regulations, the exporter needs to determine if the product being exported requires an export license. Determining which authorization is needed is based on three factors:

1. What product is being exported? The Government restricts exportation of some products for reasons of national security, foreign policy, short supply, nuclear proliferation, or terrorist activity. For example, cedar logs require an export license because of short supply. But almost no other agricultural products require an export license for these reasons.

The Bureau of Export Administration (BXA), U.S. Department of Commerce, can provide information on how to determine if a product is restricted and requires an export license. The number to call at BXA is (202) 482-4811.

2. Where is the product's final destination? Are there any trade restrictions on products going to this destination? U.S. Government policy restricts trade with some countries. Exporting to a country with trade restrictions is either prohibited or requires an export license. At the time of publication, there are trade embargoes on exports to Iran, Cuba, Libya, and North Korea.

To verify that there are no trade restrictions for exporting to any given country, contact the U.S. Department of the Treasury, Office of Foreign Assets Control, 1500 Pennsylvania Avenue NW, Washington, DC 20220, telephone (202) 622-2480, fax (202) 622-1657, or Web site: [www.treas.gov/lofac](http://www.treas.gov/lofac)

3. What will the product be used for? The Government restricts exportation of some products if they could be used for terrorist activities.

**License Exception**—If the exporter determines that there are no restrictions on exporting a product to the destination country, there is no need to apply for a license. Agricultural exporters ship under a license exception and type “NLR” (no license required) when requested for the license symbol on the shipper's export declaration. A license exception is a broad grant of authority by the U.S. Government to all exporters for certain categories of products. There is no application process for a license exception. Agricultural products usually qualify for this type of license.

**Export License**—If the exporter determines that the product being shipped is considered by the U.S. Government to be in short supply, or is being shipped to a country with which the U.S. Government has trade restrictions, or could be used for terrorist activities, an export license will be necessary. An export license is a specific grant of authority from the U.S. Government to

a particular exporter to export a particular product. This license is granted on a case-by-case basis, either for a single transaction or for a specified period of time. An exporter must apply for an export license. For information on obtaining an export license, contact BXA, U.S. Department of Commerce. The number to call at BXA is (202) 482-4811.

Although most agricultural shipments are exported using a license exception, exporters should know that violations of the Export Administration Regulations carry both civil and criminal penalties. It is recommended that exporters follow the above procedure to verify that they are using the correct export authorization.

Other U.S. Government agencies may have additional export regulations regarding a given commodity other than the licensing requirements. For instance, exporters of alcoholic beverages must obtain a permit from the U.S. Department of the Treasury's Bureau of Alcohol, Tobacco, and Firearms. The U.S. Department of the Interior, Fish, and Wildlife Service restricts exportation of endangered wildlife and plants. (See Trade Assistance section of this handbook for contact information.) Many States also have rules and regulations governing exports. A State's department of agriculture can assist exporters in understanding State rules and regulations.

### ***Schedule B Harmonized Commodity Description and Coding System***

The United States has adopted the Harmonized Commodity Description and Coding System (HS) for classifying merchandise in international trade. Exporters, freight forwarders, and carriers must report export shipments in terms of the HS on their SEDs. The HS code for any given agricultural product can be obtained from the U.S. Department of Commerce publication: *Schedule B—Statistical Classification of Domestic and Foreign Commodities Exported from the United States*, or by contacting the Bureau of the Census, Foreign Trade Division, Nondurables Section, Washington, DC 20233, (301) 457-3259 or 457-2981.

When filling out the Schedule B commodity number on the SED, be sure to include the entire 10-digit code and the check digit. The Schedule B commodity number's corresponding quantities and shipping weights must be reported on the SED using the metric system. The following conversion factors can be used to convert English weights into metric units.

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### Approximate Metric Conversion Factors

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When You Know Number Of	Multiply By	To Find The Number Of
pounds (lb)	0.4536	kilograms (kg)
long tons (lt)	1.016	metric tons (mt)
short tons (st)	0.907	metric tons (mt)

---

### Bill of Lading

Ocean bills of lading (b/l) serve three purposes:

- They act as a contract between the owner of the goods and the carrier to deliver the goods, spelling out all legal responsibilities and liability limits for all parties to the shipment.
- They act as receipt from the ocean carrier, confirming that they have received the goods for shipment.
- They act as title to the shipment and can be used to transfer title to the goods to a party named in the document.

The b/l is issued by the steamship line. Bills of lading can be made out in two different ways, "to order" or "direct" (straight). When the b/l is made "to order" it offers protection to the shipper by making it absolutely necessary that the consignee present the original endorsed b/l before the goods will be released from the port of destination. An original endorsed b/l is called a negotiable b/l, and acts as title to the goods. A copy of an original endorsed bill of lading is non-negotiable and cannot act as title to the goods.

### Air Waybill

The air waybill, like the bill of lading, is a contract of carriage between the air carrier and shipper. Due to the short transit times there are no negotiable air waybills. The air waybill is issued by the airline or consolidator.

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Pro Forma Invoice

<p>FRESH ORANGE EXPORTER 123 FIRST STREET AMERICAN CITY, U. S. A. 10000</p>	<p>CARRIER'S BOOKING NUMBER 123456 BILL OF LADING NUMBER APLU123456789 SHIPPER'S REFERENCE NUMBER FOE 001 JEL REFERENCE NUMBER SFO1060423 TRAFFIC MANAGER D. ENBERG CARRIER'S AGENT AMERICAN PRESIDENT LINES</p>						
<p>ORIENTAL FRESH FOODS 456 ORIENTAL BEND ROAD KOWLOON, HONG KONG</p>	<p>FORWARDING AGENT (415) 781-7040 J. E. LOWDEN &amp; CO. 275 Battery Street, Ste 400 San Francisco CA 94111-3701 POINT &amp; COUNTRY OF ORIGIN FAX 415-392-3790 CALIFORNIA USA</p>						
<p>ORIENTAL FRESH FOODS 456 ORIENTAL BEND ROAD KOWLOON, HONG KONG</p>	<p>TLX/EMAIL 404235592</p>						
<p>PIER/TERMINAL BERTH 223 VESSEL VOYAGE # FLAG V. 13 APL JAPAN PORT OF DISCHARGE HONG KONG</p>	<p>PORT OF LOADING SAN PEDRO FOR TRANSSHIPMENT TO HONG KONG</p>						
<p><b>PROFORMA INVOICE</b></p> <table border="0"> <tr> <td>100 CARTONS SIZE 88 USA BRAND NAVEL ORANGES AT USD15.70</td> <td>USD 6280.00</td> </tr> <tr> <td>350 CARTONS SIZE 72 USA BRAND NAVEL ORANGES AT USD16.20</td> <td>USD 8910.00</td> </tr> <tr> <td>950 CARTONS C. I. F. HONG KONG</td> <td>USD 15190.00</td> </tr> </table> <p>TERMS OF PAYMENT: CAD T/T TO OUR BANK ACCOUNT WITHIN 10 DAYS OF SHIPMENT DATE</p> <p>THANK YOU FRESH ORANGE EXPORTER</p>		100 CARTONS SIZE 88 USA BRAND NAVEL ORANGES AT USD15.70	USD 6280.00	350 CARTONS SIZE 72 USA BRAND NAVEL ORANGES AT USD16.20	USD 8910.00	950 CARTONS C. I. F. HONG KONG	USD 15190.00
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<p> </p>							



Source: J.E. Lowden & Company

Commercial Invoice

11 MAR 97	INVOICE	FOE 001	11 MAR 97																
<b>SELLER:</b> FRESH ORANGE EXPORTER 123 FIRST STREET AMERICAN CITY, U. S. A. 10000		CARRIER'S BOOKING NUMBER 123456 BILL OF LADING NUMBER APLU123456789 SHIPPER'S REFERENCE NUMBER FOE 001 JEL REFERENCE NUMBER SFO1060423 TRAFFIC MANAGER D. ENBERG CARRIER'S AGENT AMERICAN PRESIDENT LINES FORWARDING AGENT (415)781-7040 J. E. LOWDEN & CO. FMC 87 275 Battery Street #400 San Francisco, CA 94111																	
<b>SOLD TO:</b> ORIENTAL FRESH FOODS 456 ORIENTAL BEND ROAD KOWLOON, HONG KONG		POINT & COUNTRY OF ORIGIN CALIFORNIA USA CUSTOMER ORDER NO: TERMS OF SALE: C. I. F. HONG KONG																	
PIER/TERMINAL BERTH 223 VESSEL VOYAGE # FLAG V. 13 APL JAPAN PORT OF DISCHARGE HONG KONG	SAN PEDRO PORT OF LOADING SAN PEDRO FOR TRANSSHIPMENT TO HONG KONG	<b>SHIP TO:</b>																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">DESCRIPTION</th> <th style="text-align: center;">SIZE</th> <th style="text-align: center;">PRICE</th> <th style="text-align: center;">AMOUNT</th> </tr> </thead> <tbody> <tr> <td>400 CARTONS</td> <td style="text-align: center;">68</td> <td style="text-align: center;">15.70</td> <td style="text-align: right;">6,280.00</td> </tr> <tr> <td>550 CARTONS</td> <td style="text-align: center;">72</td> <td style="text-align: center;">16.20</td> <td style="text-align: right;">8,910.00</td> </tr> <tr> <td colspan="3">TOTAL 950 CARTONS "USA BRAND" FRESH NAVEL ORANGES</td> <td style="text-align: right;">USD 15,190.00 C. I. F. HONG KONG</td> </tr> </tbody> </table>				DESCRIPTION	SIZE	PRICE	AMOUNT	400 CARTONS	68	15.70	6,280.00	550 CARTONS	72	16.20	8,910.00	TOTAL 950 CARTONS "USA BRAND" FRESH NAVEL ORANGES			USD 15,190.00 C. I. F. HONG KONG
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550 CARTONS	72	16.20	8,910.00																
TOTAL 950 CARTONS "USA BRAND" FRESH NAVEL ORANGES			USD 15,190.00 C. I. F. HONG KONG																
WE CERTIFY THAT THIS INVOICE IS TRUE AND CORRECT. WE CERTIFY THAT THE MERCHANDISE IS ORIGIN OF THE U. S. A.																			
 FRESH ORANGE EXPORTER WE HEREBY CERTIFY THAT THIS INVOICE IS TRUE AND CORRECT																			

Source: J.E. Lowden & Company

Phytosanitary Certificate

<small>No phytosanitary certificate can be issued until an application is completed (7-01-93)</small>		<small>See reverse for additional IAMS information</small>		<small>FORM APPROVED 1</small> <small>OMR NO. 0575 0012</small>
UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE PLANT PROTECTION AND QUARANTINE		FOR OFFICIAL USE ONLY		
<b>PHYTOSANITARY CERTIFICATE</b>		PLACE OF ISSUE:	NO. <b>FPC 2000003</b>	
TO: THE PLANT PROTECTION ORGANIZATION(S) OF		DATE INSPECTED:		
<b>CERTIFICATION</b>				
This is to certify that the plant or plant products described below have been inspected according to appropriate procedures and are considered to be free from quarantine pests, and practically free from other injurious pests, and that they are considered to conform with the current phytosanitary regulations of the exporting country.				
<b>DISINFESTATION AND/OR DISINFECTION TREATMENT</b>				
1. DATE		2. TREATMENT		
3. CHEMICAL (active ingredient)		4. DURATION AND TEMPERATURE		
5. CONCENTRATION		6. ADDITIONAL INFORMATION		
<b>DESCRIPTION OF THE CONSIGNMENT</b>				
7. NAME AND ADDRESS OF THE EXPORTER		8. DECLARED NAME AND ADDRESS OF THE CONSIGNEE		
9. NAME OF PRODUCE AND QUANTITY DECLARED		10. BOTANICAL NAME OF PLANTS		
11. NUMBER AND DESCRIPTION OF PACKAGES		12. DISTINGUISHING MARKS		
13. PLACE OF ORIGIN		14. DECLARED MEANS OF CONVEYANCE		
		15. DECLARED POINT OF ENTRY		
Any intentional false statement in this phytosanitary certificate or misrepresentation relative to this phytosanitary certificate is a violation of law, punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both. (19 U.S.C. 9901)				
<b>ADDITIONAL DECLARATION</b>				
				
16. DATE ISSUED		17. NAME OF AUTHORIZED OFFICER (Type or Print)		18. SIGNATURE OF AUTHORIZED OFFICER
No financial liability shall attach to the United States Department of Agriculture or to any officer or representative of the Department with respect to this certificate.				
PPQ FORM 577 (JUN 96)		<small>Previous editions of PFC series may be used</small>		PART 1 - SHIPPER'S ORIGINAL

Source: USDA Animal and Plant Health Inspection Service



**Export Certificate—Processed Plant Products**

Public reporting burden for this collection of information is estimated to average 33 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Office, DPM, Room 434 W, Washington, D.C. 20258, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503

FORM APPROVED  
OMB NO. 0579-0052

UNITED STATES DEPARTMENT OF AGRICULTURE  
ANIMAL AND PLANT HEALTH INSPECTION SERVICE  
PLANT PROTECTION AND QUARANTINE

FOR OFFICIAL USE ONLY

**EXPORT CERTIFICATE  
PROCESSED PLANT PRODUCTS**

PLACE

DATE

NUMBER: **P 072608**

NAME AND ADDRESS OF EXPORTER

NAME AND ADDRESS OF CONSIGNEE

MEANS OF CONVEYANCE

POINT OF ENTRY

DESCRIPTION OF CONSIGNMENT

PRODUCT (Kind, Quantity, and Weight)

IDENTIFICATION

ORIGIN

This is to affirm that, based upon inspection of submitted samples and/or by virtue of processing received, the plant products described above are believed to be free from injurious plant pests.



NAME OF AUTHORIZED OFFICER

SIGNATURE

No liability shall attach to the United States Department of Agriculture or to any officer or representative of the Department with respect to this certificate.

PPQ FORM 578  
(OCT 91)

PART 1 - SHIPPER'S ORIGINAL

Federal-State Inspection Certificate—Export Apple and Pear Act



U.S. DEPARTMENT OF AGRICULTURE  
 AGRICULTURAL MARKETING SERVICE  
 FRUIT AND VEGETABLE DIVISION

X-021655-6

EXPORT FORM CERTIFICATE

INSPECTION STARTED: 0 9 2 2 9 7		WARNING: Any person who knowingly shall falsely make, issue, alter, forge, or counterfeit this certificate, or participate in any such actions, is subject to a fine of not more than \$1,000 or imprisonment for not more than one year, or both.	
INSPECTION COMPLETED: 0 9 2 2 9 7			
APPLICANT / SHIPPER PAPA'S APPLES		CITY / STATE COURTLAND, CA	
RECEIVER MAMA'S APPLES, LTD		CITY / COUNTRY LONDON, ENGLAND	
<input type="checkbox"/> CARRIER ID		CERT. / WORKSHEET NUMBER	
<input checked="" type="checkbox"/> PLI No. CA FSL 922-SAC		N/A	
PRODUCT	NUMBER AND TYPE OF CONTAINERS	DESCRIPTION OF PRODUCT (BRAND, VARIETY, SIZE, ORIGIN, etc.)	GRADE
APPLES	400 CTNS	"Export" Fuji 72 count Produce of USA	US Extra Fancy
		All apples show 50% to 100% mostly 50% to 75% blush or red surface color. Mostly hard some firm. Defects well within tolerance.	
		No decay.	
THIS IS TO CERTIFY THAT THE <input checked="" type="checkbox"/> APPLES, <input type="checkbox"/> PEARS, <input type="checkbox"/> TABLE GRAPES IN THE ABOVE IDENTIFIED LOT(S) HAVE BEEN INSPECTED AT THE PLACE AND DATE STATED ABOVE AND FOUND TO MEET THE REQUIREMENTS OF THE <input checked="" type="checkbox"/> Export Apple and Pear Act <input type="checkbox"/> Export Grape and Plum Act <input type="checkbox"/> Export Grape and Plum Act except for export to destinations in Europe, Greenland, or Japan.			
REMARKS: Applicant states above products to be air shipped to destination.			
DATA BLOCK - FOR USDA USE ONLY CORRECTS PV-207 CERTIFICATE NO.: APPLICANT NO.: 21 CWT: ON-SITE (HOURS): O.T. (HOURS): TRAVEL (MILES): O.T. (HOURS): OTHER: \$:		I, the undersigned, a duly authorized inspector of the United States Department of Agriculture, do hereby certify that samples of the herein described product were inspected and the grades as shown by said samples were as herein stated. FEE: \$ OVERTIME: EXPENSES: ESTIMATED TOTAL: \$ Issuing Office: West Sacramento, CA Information listed below is furnished by the applicant/packer and is not the responsibility of the USDA Inspection Service. VESSEL: VOYAGE NO.: CONTAINER NO.: OTHER RELEVANT SHIPPING INFORMATION: AUTHORIZED REPRESENTATIVE:	

FORM PV-207 (2/79)

Source: USDA Agricultural Marketing Service

Federal-State Inspection Certificate—Export Grape and Plum Act



U.S. DEPARTMENT OF AGRICULTURE  
 AGRICULTURAL MARKETING SERVICE  
 FRUIT AND VEGETABLE DIVISION

X-021653-1

EXPORT FORM CERTIFICATE

INSPECTION STARTED: M M D D Y Y 0 9 1 5 9 7		WARNING: Any person who knowingly shall falsely make, issue, alter, forge, or counterfeit this certificate, or participate in any such actions, is subject to a fine of not more than \$1,000 or imprisonment for not more than one year, or both.	
INSPECTION COMPLETED: M M D D Y Y 0 9 1 5 9 7			
APPLICANT / SHIPPER: ABC TABLE GRAPES		CITY / STATE: DELANO, CA	
RECEIVER: MONGOLIAN TRADING COMPANY		CITY / COUNTRY: BEIJING, CHINA	
<input type="checkbox"/> CARRIER ID		CERT / WORKSHEET NUMBER	
<input checked="" type="checkbox"/> PLI No. CA FSL 9/5 - DEL		N/A	
PRODUCT	NUMBER AND TYPE OF CONTAINERS	DESCRIPTION OF PRODUCT ( BRAND, VARIETY, SIZE, ORIGIN, etc. )	GRADE
TABLE GRAPES	540 LUGS	"CHINA GOLD" FLAME SEEDLES PRODUCE OF USA	US NO 1 TABLE
	BUNCHES	MOSTLY MEDIUM, SOME SMALL	
	BERRIES	MOSTLY MEDIUM, SOME SMALL	
		MOSTLY WELL, MANY REASONABLY WELL COLORED	
	DEFECTS	AVERAGE WITHIN TOLERANCE	
THIS IS TO CERTIFY THAT THE <input type="checkbox"/> APPLES, <input type="checkbox"/> PEARS, <input type="checkbox"/> TABLE GRAPES IN THE ABOVE IDENTIFIED LOT(S) HAVE BEEN INSPECTED AT THE PLACE AND DATE STATED ABOVE, AND FOUND TO MEET THE REQUIREMENTS OF THE:			
<input type="checkbox"/> Export Apple and Pear Act			
<input type="checkbox"/> Export Grape and Plum Act			
<input checked="" type="checkbox"/> Export Grape and Plum Act except for export to destinations in Europe, Greenland, or Japan.			
REMARKS			
<b>DATA BLOCK - FOR USDA USE ONLY</b> CORRECTS (POST CERTIFICATE NO.): APPLICANT NO.: 21		The undersigned, a duly authorized inspector of the United States Department of Agriculture, do hereby certify that samples of the herein described product were inspected and the grades as shown by said samples were as herein stated.	FEE: \$ OVERTIME: EXPENSES: ESTIMATED TOTAL: \$
CWT	ON SITE HOURS	ISSUING OFFICE: DELANO, CA	
	O.T. (hours)	Information listed below is furnished by the applicant/packer and is not the responsibility of the USDA Inspection Service.	
	TRAVEL MILES	VESSEL:	VOYAGE NO. CONTAINER NO.
INSPECTED BY	O.T. (hours)	OTHER RELEVANT SHIPPING INFORMATION:	
	OTHER:	BOOKING # A-1357-BC1-89	
	\$	AUTHORIZED REPRESENTATIVE	

FORM PV-287 (3/79)

Source: USDA Agricultural Marketing Service

Certificate of Quality and Condition

UNITED STATES DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE		Please refer to this certificate by number and inspection office
<b>CERTIFICATE OF QUALITY AND CONDITION</b> (PROCESSED FOODS)		166-A-1 December 1996 EXHIBIT 3
<p><i>This certificate is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained. It does not excuse failure to comply with any applicable Federal or State laws. WARNING: Any person who knowingly falsely make, issue, alter, forge, or counterfeit this certificate, or participate in any such action is subject to a fine of not more than \$1,000 or imprisonment for not more than one year, or both (7 U.S.C. 1622 (h)).</i></p> <p><i>The conduct of all services and the licensing of all personnel under the regulations governing such services shall be accomplished without discrimination as to race color, religion, sex or national origin.</i></p>		
<b>APPLICANT</b>	<b>ADDRESS</b>	<b>DATE</b>
ABC Frozen Foods	Portland, Oregon 97206	March 5, 1996
<b>RECEIVER OR BUYER</b>	<b>ADDRESS</b>	
Trappe Trading Co.	London, England	
<b>SOURCE OF SAMPLES</b>	<b>PRODUCT INSPECTED</b>	
Submitted by Applicant	FROZEN WHOLE KERNEL CORN	
<b>CODE MARKS ON CONTAINERS</b>		
T34; and T36...		
<b>PRINCIPAL LABEL MARKS</b>		
*Frozen Cut Corn net weight 16 ounces. Distributed by Major, Inc. Sacramento, California 92210*		
Net weights:	16.0 and 16.2 ounces.	
Color:	Golden (or yellow).	
<b>GRADE:</b>		
J. S. Grade C or U. S. Standard		
Score: 15 points each		
<b>CERTIFICATE RESTRICTED:</b> This certificate covers the examination of 2-16 ounce cartons submitted by applicant and does not officially represent any lot.		
<b>REMARKS:</b>		
Exporter declares this consignment is for 800 cases, 24/16 ounce containers, (19,200 pounds applicant's count and weight), and covered by loading manifest number A-3345.		
Pursuant to the regulations issued by the Secretary of Agriculture under the Agricultural Marketing Act of 1946, as amended (7 U.S.C. 1621-1627), governing the inspection and certification of the product designated herein. I certify that the quality and condition of the product as shown by samples inspected on the above date were as shown, subject to any restrictions specified above.		
	<b>ADDRESS OF INSPECTION OFFICE</b>	<b>SIGNATURE OF INSPECTOR</b>
	340 High Street, NE Salem, Oregon 97301-3631 (503) 399-5761	John Doe
FORM FV-146CS (9-92)		

Source: USDA Agricultural Marketing Service

Meat and Poultry Export Certificate of Wholesomeness

U.S. DEPARTMENT OF AGRICULTURE FOOD SAFETY AND INSPECTION SERVICE MEAT AND POULTRY INSPECTION OPERATIONS <b>MEAT AND POULTRY EXPORT CERTIFICATE OF WHOLESOMENESS</b>		A knowingly false entry or false alteration of any entry on this certificate may result in a fine of not more than \$10,000 or imprisonment for not more than five years or both. (18 USC 1301). Additional penalties exist under the Federal Meat Inspection Act (21 USC 611 (a) (1), (2), and (5); 21 USC 678) and the Poultry Products Inspection Act (21 USC 498 (c) (1), (2), and (5); 21 USC 461) for an unauthorized or false alteration or reuse of this certificate.		
AREA OFFICE Long Beach, CA	COUNTRY OF DESTINATION Singapore	DATE ISSUED June 9, 1997	MPC - 339824	
EXPORTED BY (Applicant's name and address including ZIP Code) Columbia Trading Co. 33 Pacific View Ave. Torrance, CA 90509		PRODUCT EXPORTED FROM: EST. / PLANT NUMBER (if applicable) Est. 3000X CITY Los Angeles, CA		
CONSIGNEE TO (Name and address including ZIP Code) Columbia Trading Co. 26 Harbor St. Singapore		<input type="checkbox"/> @ SLAUGHTERING PLANT <input type="checkbox"/> @ PROCESSING PLANT <input checked="" type="checkbox"/> @ WAREHOUSE <input type="checkbox"/> @ DOCKSIDE		
TOTAL MARKED NET WEIGHT 42,000 lbs.	TOTAL CONTAINERS 1207			
PRODUCT AS LABELED	MARKED WEIGHT OF LOT (1)	NUMBER OF PACKAGES IN LOT (1)	SHIPPING MARKS (1)	EST. / PLANT NUMBER ON PRODUCT
Frozen Beef Tenderloins	3550 lbs.	50	4336/Singapore	Est. 38
Frozen Beef Short Ribs	3700 lbs.	50	" "	Est. 38
Beef Stew 24 oz.	3240 lbs.	40	" "	Est. 38
Frozen Corned Beef Brisket	3900 lbs.	50	" "	Est. 00
Assorted Beef Jerky 12-8 oz.	1200 lbs.	200	" "	Est. 00
Frozen Fryer Parts	6000 lbs.	150	" "	P-42
Frozen Chicken Wings	3200 lbs.	80	" "	P-42
White Turkey Rolls	4700 lbs.	235	" "	P-00
Raw Turkey Breast	6450 lbs.	150	" "	P-00
Cooked Boneless Diced Chicken Meat	6060 lbs.	202	" "	P-42X
<i>1/ As stated by applicant or contractor</i>				
REMARKS The canned products have been manufactured and inspected in accordance with Section 318.11 of USDA regulations.				
<input checked="" type="checkbox"/> I CERTIFY that the meat or meat food product specified hereon is from animals that received both antemortem and postmortem inspection and were found sound and healthy and that it has been inspected and passed as provided by law and regulations of the Department and is sound and wholesome.				
<input checked="" type="checkbox"/> I CERTIFY that the poultry and poultry products specified above came from birds that were officially given an antemortem and postmortem inspection and passed in accordance with applicable laws and regulations of the United States Department of Agriculture and are wholesome and fit for human consumption.				
NOT VALID UNLESS SIGNED BY AN INSPECTOR OF MEAT AND POULTRY INSPECTION PROGRAM				
By order of the Secretary of Agriculture		INSPECTOR AND CIRCUIT NUMBER <i>Signature Here</i> James R. David, DVM 202-21		
This certificate is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained. This certificate does not excuse failure to comply with any of the regulatory laws enforced by the United States Department of Agriculture.				
FIS FORM 9060-5 (9 / 92)		REPLACES FIS FORM 9060-5 (5/85), WHICH MAY BE USED UNTIL EXHAUSTED. REPLACES MP FORM 130 (2/81), WHICH IS OBSOLETE		ORIGINAL

Source: USDA Food Safety and Inspection Service

Veterinary Health Certificate

<p>UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE</p> <p><b>EXPORT CERTIFICATE</b> ANIMAL PRODUCTS</p>	<p><b>FOR OFFICIAL USE ONLY</b></p> <p>Port</p> <p>Date and No. <b>EXAMPLE ONLY</b></p>
--	---


This is to certify that rinderpest, foot-and-mouth disease, and contagious bovine pleuropneumonia do not exist in the United States of America.

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ADDITIONAL DECLARATION

THE PLANT OF ORIGIN CERTIFIES THAT THE MATERIALS USED IN THE MANUFACTURING OF THE DEGREASED BONE CHIPS TO BE SHIPPED WERE FROM ANIMALS SLAUGHTERED UNDER THE SUPERVISION OF USDA AND PROCESSED AT A FACILITY CAPABLE OF SUBJECTING THE RAW MATERIALS TO A TEMPERATURE OF 260 DEGREES FAHRENHEIT AND THAT THE DRY RENDERED PRODUCT HAS BEEN SUBJECTED TO A TREATMENT OF 210-250 DEGREES FAHRENHEIT FOR A PERIOD OF AT LEAST ONE AND ONE HALF HOURS.

USDA, APHIS, VETERINARY SERVICES HAS ON FILE A LETTER ATTESTING TO THE ABOVE.



(Signature)

**APHIS OFFICER**

(Title)

---

DESCRIPTION OF THE CONSIGNMENT

NAME AND ADDRESS OF EXPORTER  
**EXCEL CORPORATION**  
 123 Main Street  
 Anywhere, MD 12345

---

NAME AND ADDRESS OF CONSIGNEE  
**Mr. Marolo Garcia**  
 USDA/APHIS/VS/NCIE  
 4700 River Road, Unit 40  
 Riverdale, MD 20737

---

PRODUCT (Kind, quantity, weight)  
**4 CONTAINERS, BONES GROUND AND ARE CHIPS AT 178660.0 POUNDS**

---

IDENTIFICATION

---

CONVEYANCE


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No liability shall attach to the United States Department of Agriculture or to any officer or representative of the Department with respect to this certificate.

**VS FORM 16-4**  
(NOV 72)

Source: USDA Animal and Plant Health Inspection Service

Packing List

PACKING LIST				
<b>SHIPPER:</b> FRESH ORANGE EXPORTER 123 FIRST STREET AMERICAN CITY, U. S. A. 10000	CARRIER'S BOOKING NUMBER 123456 10 MAR 97 BILL OF LADING NUMBER APLU123456789 SHIPPER'S REFERENCE NUMBER FDE 001 JEL REFERENCE NUMBER SF01060423 TRAFFIC MANAGER D. ENBERG CARRIER'S AGENT AMERICAN PRESIDENT LINES FORWARDING AGENT 415-781-7040 J. E. LOWDEN & CO. FMC 87 275 Battery Street, Ste 400 San Francisco CA 94111-3701 POINT & COUNTRY OF ORIGIN FAX (415)392-3970 CALIFORNIA USA			
<b>NOTIFY PARTY:</b>  ORIENTAL FRESH FOODS 456 ORIENTAL BEND ROAD KOWLOON, HONG KONG				
PIER/TERMINAL BERTH 223 VESSEL VOYAGE # FLAG V. 13 APL JAPAN PORT OF DISCHARGE HONG KONG	SAN PEDRO PORT OF LOADING SAN PEDRO FOR TRANSSHIPMENT TO HONG KONG			
MARKS & NOS.	NO. PKGS.	DESCRIPTION OF GOODS	GRS WEIGHT	MEASUREMENT
CONTAINER APLU 596327-1	950	CARTONS FRESH ORANGES 1/40 FT. CY/CY CONTAINER SHIPPERS LOAD AND COUNT (NET WEIGHT 35,150 LBS.) CARGO UNDER REFRIGERATION MAINTAIN TEMPERATURE AT 42 DEGREE F VENTS 45 CFM	39900# 18098K	1140 ' 32.280M3
	950 TOTAL		39900# 18098K	1140 ' 32.280M3
WE HEREBY CERTIFY THAT THE ABOVE WEIGHTS ARE TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE.				
FRESH ORANGE EXPORTER 123 FIRST STREET AMERICAN CITY, U. S. A. 10000   D. ENBERG				

Source: J.E. Lowden & Company

Shipper's Letter of Instruction

SHIPPER'S INSTRUCTIONS & CONFIRMATION MEMO				
J. E. LOWDEN & CO. - International Freight Forwarders 275 Battery Street, Suite 400, San Francisco, CA 94111 FMC#87 PHONE: (415) 781-7040 FAX: (415) 392-3970				
SHIPPER / EXPORTER		SHIPPER TO ENTER INFO & SEND TO LOWDEN OR LOWDEN TO RECORD INFO FROM PHONE CALL THEN ADD INFO & SEND TO SHIPPER OR OTHERS		LOWDEN FILE NO. <b>SF010</b>
CONSIGNEE		EXPORTER'S REFERENCE		SHIPPER'S REP
NOTIFY PARTY		SERVICE CONTRACT		LOWDEN'S REP
LAST RECEIVING DATE & TIME    SAIL DATE    ARRIVAL DATE		OCEAN CARRIER		
PIER / TERMINAL		BOOKING NUMBER		DATE BOOKED
TRUCK / RAIL CARRIER		POINT & COUNTRY ORIGIN		
VESSEL / VOYAGE		SUPPLIER / LOCATION OF CARGO FOR PICK UP		
PORT OF DISCHARGE		TERMINAL CHARGES    PREPAID    COLLECT		
MARKS & NUMBERS		PLACE OF RECEIPT		OCEAN FREIGHT CHARGES    PREPAID    COLLECT
NUMBER OF PACKAGES		PORT OF LOADING		TEMPERATURE SETTINGS    VENTS
DESCRIPTION OF CARGO (SHOW SUFFICIENT DETAIL TO DETERMINE SCHEDULE B NUMBER)		RATES & COMMENTS		
GROSS WEIGHT & CUBIC MEASURE		NET QUANTITY, UNITS & FOB VALUE FOR SDG		
NEED MARINE INSURANCE: YES ___ NO ___		DECLARED VALUE FOR B/L: _____ USD		
HAZARDOUS: YES ___ NO ___    EXPORT LICENSE: YES ___ NO ___    NEED MARINE INSURANCE: YES ___ NO ___ (Additional details and documents required if hazardous or licensed)				
<b>POWER OF ATTORNEY - DESIGNATION OF FORWARDING AGENT</b> I hereby authorize J. E. Lowden & Co. to act as our forwarding agent for export control and customs purposes, and to perform other acts to facilitate this export shipment on our behalf. We also authorize J. E. Lowden & Co. to delegate this authority to their agents or representatives.  Name: _____ Date: _____ Title: _____ Shipper's EIN: _____ Required unless a separate power of attorney is on file at J. E. Lowden & Co.		<b>TRANSMITTAL RECORD</b> DATE OF INSTRUCTIONS FROM SHIPPER: _____ INSTRUCTIONS BY: PHONE ___ FAX ___ IN PERSON ___ DATE MEMO SENT BY FORWARDER: _____ SUBSEQUENT COMMUNICATIONS: TO: _____ FROM: _____ DATE: _____ TO: _____ FROM: _____ DATE: _____ TO: _____ FROM: _____ DATE: _____		

Source: J.E. Lowden & Company



Dock Receipt

**DOCK RECEIPT**

<b>SHIPPER/EXPORTER</b> FRESH ORANGE EXPORTER 123 FIRST STREET AMERICAN CITY, U.S.A. 10000		<b>DOCUMENT NO.</b> BOOKING#: 123456      APLU123456789	
<b>CONSIGNEE</b> ORIENTAL FRESH FOODS 456 ORIENTAL BEND ROAD KOWLOON, HONG KONG		<b>EXPORT REFERENCES</b> SHIPPER'S REF NO: FOE 001 JEL REF NO: SF01060423 SC#	
<b>NOTIFY PARTY</b> ORIENTAL FRESH FOODS 456 ORIENTAL BEND ROAD KOWLOON, HONG KONG		<b>FORWARDING AGENT - REFERENCES</b> J.E. LOWDEN & CO. FMC87 - CHB5118 275 Battery Street #400 San Francisco, CA 94111	
<b>PIER OR AIRPORT</b> SAN PEDRO		<b>POINT AND COUNTRY OF ORIGIN</b> CALIFORNIA USA	
<b>EXPORTING CARRIER (Vessel/Airline)</b> APL JAPAN		<b>ONWARD INLAND ROUTING</b> BERTH 223	
<b>AIR/SEA PORT OF DISCHARGE</b> HONG KONG		<b>FOR TRANSHIPMENT TO</b> HONG KONG	
<b>PARTICULARS FURNISHED BY SHIPPER</b>			


MARKS AND NUMBERS	NO. OF PGS.	DESCRIPTION OF PACKAGES AND GOODS	GROSS WEIGHT	MEASUREMENT
FREIGHT PREPAID      TERMINAL CHARGES PREPAID				
CONTAINER APLU 596327-1	950	CARTONS FRESH ORANGES 1/40 FT. CY/CY CONTAINER SHIPPER'S LOAD AND COUNT (NET WEIGHT 35,150 LBS.) CARGO UNDER REFRIGERATION MAINTAIN TEMPERATURE AT 42 DEGREE F VENTS 45 CFM	39900#	1140'
	950	TOTAL LADEN ON BOARD	18098K	32.280M
LICENSE EXCEPTION: NLR NO SED REQUIRED, SEC 30.39 FTSR, CAS-JL			TOTAL	39900#      1140' 18098K      32.280M

<p><b>DELIVERED BY:</b></p> <p>LIGHTER ..... TRUCK .....</p> <p>ARRIVED- DATE ..... TIME .....</p> <p>UNLOADED-DATE ..... TIME .....</p> <p>CHECKED BY .....</p> <p>PLACED IN SHIP ON DOCK LOCATION .....</p> <p>302 WHSE. NO. 0846 JOB NO. H 6945</p>	<p>RECEIVED THE ABOVE DESCRIBED GOODS OR PACKAGES SUBJECT TO ALL THE TERMS OF THE UNDERSIGNED'S REGULAR FORM OF DOCK RECEIPT AND BILL OF LADING WHICH SHALL CONSTITUTE THE CONTRACT UNDER WHICH THE GOODS ARE RECEIVED, COPIES OF WHICH ARE AVAILABLE FROM THE CARRIER ON REQUEST AND MAY BE INSPECTED AT ANY OF ITS OFFICES.</p> <p style="text-align: right;"><b>FOR THE MASTER</b></p> <p>BY ..... RECEIVING CLERK</p> <p>DATE .....</p>
--	---

**ONLY CLEAN DOCK RECEIPT ACCEPTED.**

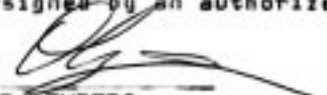
Source: J.E. Lowden & Company

Certificate of Origin

CERTIFICATE OF ORIGIN					
<b>SHIPPER:</b> FRESH ORANGE EXPORTER 123 FIRST STREET AMERICAN CITY, U. S. A. 10000		CARRIER'S BOOKING NUMBER 123456 BILL OF LADING NUMBER APLU123456789 SHIPPER'S REFERENCE NUMBER FDE 001 JEL REFERENCE NUMBER SF01060423 TRAFFIC MANAGER D. ENBERG CARRIER'S AGENT AMERICAN PRESIDENT LINES			
<b>NOTIFY PARTY:</b> ORIENTAL FRESH FOODS 456 ORIENTAL BEND ROAD KOWLOON, HONG KONG		FORWARDING AGENT J. E. LOWDEN & CO. FMC 87 275 Battery Street #400 San Francisco, CA 94111 PHONE (415) 781-7040 FAX (415) 392-3970 TLX/EMAIL 404235592			
PIER/TERMINAL BERTH 223 VESSEL VOYAGE # FLAG V. 13 APL JAPAN PORT OF DISCHARGE HONG KONG		<b>ALSO NOTIFY:</b> SAN PEDRO PORT OF LOADING SAN PEDRO FOR TRANSHIPMENT TO HONG KONG			
MARKS & NOS.	NO.	PKGS.	DESCRIPTION OF GOODS	GRS WEIGHT	MEASUREMENT
CONTAINER APLU 596327-1	950		CARTONS FRESH ORANGES 1/40 FT. CY/CY CONTAINER SHIPPER'S LOAD AND COUNT (NET WEIGHT 35,150 LBS.) CARGO UNDER REFRIGERATION MAINTAIN TEMPERATURE AT 42 DEGREE F VENTS 45 CFM	39900# 18098K	1140 ' 32.280M3
	950	TOTAL		39900# 18098K	1140 ' 32.280M3
LADEN ON BOARD		11 March 97		PREPAID	
THE UNDERSIGNED, D. ENBERG (AGENT), DOES HEREBY DECLARE FOR THE ABOVE NAMED SHIPPER, THE GOODS DESCRIBED ABOVE WERE SHIPPED ON THE ABOVE DATE AND CONSIGNED AS INDICATED AND ARE PRODUCTS OF THE UNITED STATES OF AMERICA. DATED AT SAN FRANCISCO, CALIFORNIA ON <u>12 March 97</u>					
 SIGNATURE OF OWNER OR AGENT					

Source: J.E. Lowden & Company

Insurance Certificate

INSURANCE CERTIFICATE																												
<p><b>AMERICAN NATIONAL FIRE INSURANCE COMPANY</b> 1350 Treat Blvd #470 Walnut Creek, CA 94596</p>	<p>CARRIER'S BOOKING NUMBER <b>123456</b>                      BILL OF LADING NUMBER <b>APLU123456789</b>                      SHIPPER'S REFERENCE NUMBER <b>FDE 001</b>                      JEL REFERENCE NUMBER <b>SF01060423</b>                      TRAFFIC MANAGER <b>D. ENBERG</b>                      CARRIER'S AGENT <b>AMERICAN PRESIDENT LINES</b>                      FORWARDING AGENT  <b>J. E. LOWDEN &amp; CO.</b>  <b>275 BATTERY ST. #400</b>  <b>SAN FRANCISCO, CA 94111</b>                      POINT &amp; COUNTRY OF ORIGIN  <b>CALIFORNIA USA</b></p>																											
<p>We hereby certify that on _____, we the undersigned, insured under, and subject to the terms and conditions of Policy No. <b>DMC-7567613</b> (terms, conditions, endorsements, riders attached) for <b>FRESH ORANGE EXPORTER</b></p>																												
<p><b>123 FIRST STREET AMERICAN CITY, U. S. A. 10000</b></p>	<p><input type="checkbox"/> FPAEC  <input type="checkbox"/> With Average, irrespective of percentage  <input checked="" type="checkbox"/> All Risk Refrigeration Clause  <input type="checkbox"/> Theft, Pilferage &amp; Non-delivery  <input type="checkbox"/> Air Clauses</p>																											
<p>IN THE SUM OF: <b>\$16709.00 *US</b></p>		<p>This insurance is subject to the following current American Institute Clauses: Amended F. C. &amp; S. Warranty, S. R. &amp; C. C. Endorsement, Marine Extension Clauses, War Risk Insurance, 60 Day South American Clause, American Institute WAREHOUSE to WAREHOUSE Clause.</p>																										
<p>PIER/TERMINAL <b>BERTH 223</b> VESSEL VOYAGE # FLAG <b>13</b> <b>APL JAPAN</b> PORT OF DISCHARGE <b>HONG KONG</b></p>	<p><b>SAN PEDRO</b> PORT OF LOADING <b>SAN PEDRO</b> FOR TRANSHIPMENT TO <b>HONG KONG</b></p>																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">MARKS</th> <th style="width: 10%;">PKGS</th> <th style="width: 55%;">DESCRIPTION</th> <th colspan="2" style="width: 20%;">GRS WEIGHT/MEASURE</th> </tr> </thead> <tbody> <tr> <td>CONTAINER</td> <td>950</td> <td>CARTONS FRESH ORANGES</td> <td>39900#</td> <td>1140</td> </tr> <tr> <td>APLU 596327-1</td> <td></td> <td>1/40 FT. CY/CY CONTAINER SHIPPER'S LOAD AND COUNT (NET WEIGHT 35,150 LBS.) CARGO UNDER REFRIGERATION MAINTAIN TEMPERATURE AT 42 DEGREE F VENTS 45 CFM</td> <td>18098K</td> <td>32.280M3</td> </tr> <tr> <td colspan="3" style="text-align: right;">950 TOTAL</td> <td>39900#</td> <td>1140</td> </tr> <tr> <td colspan="3"></td> <td>18098K</td> <td>32.280M3</td> </tr> </tbody> </table>				MARKS	PKGS	DESCRIPTION	GRS WEIGHT/MEASURE		CONTAINER	950	CARTONS FRESH ORANGES	39900#	1140	APLU 596327-1		1/40 FT. CY/CY CONTAINER SHIPPER'S LOAD AND COUNT (NET WEIGHT 35,150 LBS.) CARGO UNDER REFRIGERATION MAINTAIN TEMPERATURE AT 42 DEGREE F VENTS 45 CFM	18098K	32.280M3	950 TOTAL			39900#	1140				18098K	32.280M3
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950 TOTAL			39900#	1140																								
			18098K	32.280M3																								
<p>In case of loss the same is payable to the order of the Assured.                      This certificate invalid unless countersigned by an authorized representative of this Company or ASSURED.</p>																												
<p>  <b>D. ENBERG</b></p>																												

Source: J.E. Lowden & Company

Bill of Lading

**GLOBETRANS, INC.**

**BILL OF LADING**

FOR COMBINED TRANSPORT AND  
PORT TO PORT SHIPMENT  
NOT NEGOTIABLE UNLESS CONSIGNED "TO ORDER"

EXPORTER / SHIPPER  
FRESH ORANGE EXPORTER  
123 FIRST STREET  
AMERICAN CITY, U.S.A. 10000

BILL OF LADING NUMBER  
BOOKING#: 123456  
CONTAINER NUMBER  
APLU123456789

EXPORT REFERENCES  
SHIPPER'S REF NO: F0E 001  
JEL REF NO: SF01060423  
SC#

CONSIGNEE TO  
ORIENTAL FRESH FOODS  
456 ORIENTAL BEND ROAD  
KOWLOON, HONG KONG

FORWARDING AGENT  
J.E. LOWDEN & CO. FMC87 - CHB5118  
275 Battery Street #400  
San Francisco, CA 94111

NOTIFY PARTY / INTERMEDIATE CONSIGNEE  
ORIENTAL FRESH FOODS  
456 ORIENTAL BEND ROAD  
KOWLOON, HONG KONG

POINT (STATE) OF ORIGIN OR FTS NUMBER  
CALIFORNIA USA

* PRE-CARRIAGE BY	* PLACE OF RECEIPT BY PRE-CARRIER
VESSEL V.13	SAN PEDRO PORT OF LOADING / EXPORT
APL JAPAN FOREIGN PORT OF UNLOADING	SAN PEDRO PLACE OF DELIVERY BY ON-CARRIER
HONG KONG	HONG KONG

DESTINATION AGENT  
BERTH 223

CARRIER'S RECEIPT		PARTICULARS FURNISHED BY SHIPPER		
MARKS AND NUMBERS	NO. OF PKGS	DESCRIPTION OF PACKAGES AND GOODS	GROSS WEIGHT	MEASUREMENT
FREIGHT PREPAID CONTAINER APLU 596327-1	950	CARTONS FRESH ORANGES 1/40 FT. CY/CY CONTAINER SHIPPER'S LOAD AND COUNT (NET WEIGHT 35,150 LBS.) CARCO UNDER REFRIGERATION MAINTAIN TEMPERATURE AT 42 DEGREE F VENTS 45 CFM	39900# 18098K	1140' 32.280M
	950	TOTAL LADEN ON BOARD MAR 1 1996	TOTAL 39900# 18098K	1140' 32.280M
LICENSE EXCEPTION: NLR NO SED REQUIRED, SEC 30.39 FTSR, CAS-JL				

\* APPLICABLE ONLY WHEN DOCUMENT USED AS A COMBINED TRANSPORT BILL OF LADING

DECLARED VALUE (For AD VALOREM purpose only)  
(Refer to clause 52(c) on reverse hereof) in US \$

In accepting this bill of lading, any local customs or privileges to the contrary notwithstanding, the shipper, consignee and owner of the goods and the holder of this bill of lading, agree to be bound by all the stipulations, exceptions and conditions stated herein whether written, printed, stamped or incorporated on the front or reverse side hereof, as fully as if they were all signed by such shipper, consignee, owner or holder.

In witness whereof three (3) bills of lading, all of this tenor and date have been signed, one of which being accomplished, the others to stand void.

GLOBETRANS, INC.

BY

AGENT FOR THE CARRIER

MAR 1 1996

DATED

FREIGHT AND CHARGES			
DESCRIPTION OF CHARGE	RATE	PREPAID	COLLECT
TOTAL PREPAID			
TOTAL COLLECT			

Source: J.E. Lowden & Company

Air Waybill

SQ AIR SFO-001974				SQ AIR SFO-001974			
Shipper's Name and Address <b>FRESH ORANGE EXPORTER 123 FIRST STREET AMERICAN CITY, U. S. A. 10000</b>			Shipper's Account Number		Not Negotiable <b>SINGAPORE AIRLINES Air Waybill BOX 8746 Issued by SAN FRANCISCO CA 94128</b>		
Consignee's Name and Address <b>ORIENTAL FRESH FOODS 456 ORIENTAL BEND ROAD KOWLOON, HONG KONG</b>			Consignee's Account Number		Copies 1, 2 and 3 of this Air Waybill are originals and have the same validity. It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted for carriage) SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. ALL GOODS MAY BE CARRIED BY ANY OTHER MEANS INCLUDING ROAD OR ANY OTHER CARRIER UNLESS SPECIFIC CONTRARY INSTRUCTIONS ARE GIVEN HEREON BY THE SHIPPER, AND SHIPPER AGREES THAT THE SHIPMENT MAY BE CARRIED VIA INTERMEDIATE STOPPING PLACES WHICH THE CARRIER DEEMS APPROPRIATE. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.		
Issuing Carrier's Agent Name and City <b>J. E. LOWDEN &amp; CO IATA 01-1-3839/024 510 MYRTLE AVE., SUITE 210 S. SAN FRANCISCO, CA. 94080</b>			Agent's IATA Code <b>01-1 3839/024</b>		Accounting Information <b>JEL REF#: SFO3001924 SHIPPER#: 11334 HAWB: SFO-001974 MAWB: 618-4260-9732</b>		
Airport of Departure (Addr. of First Carrier) and Requested Routing <b>SAN FRANCISCO AIRPORT</b>			Airport of Destination <b>HONG KONG</b>				
By First Carrier <b>HKG SG</b>			Routing and Destination <b>173/13</b>		Currency <b>US\$ P C</b>		
Declared Value for Carriage <b>NVD</b>			Declared Value for Customs <b>NCV</b>				
Handling Information <b>PLEASE CONTACT CONSIGNEE UPON ARRIVAL. TP# 66-9932-4471</b>			INSURANCE - If carrier offers insurance, and such insurance is requested in accordance with the conditions thereof, indicate amount to be insured in figures in box marked "Amount of Insurance"				
No. of Pieces RCP <b>400</b>			Gross Weight <b>7200</b>		Rate Codes (consolidation form no.)		
Chargeable Weight <b>7200</b>			Rate <b>1.70</b>		Total <b>12240.00</b>		
Nature and Quantity of Goods (incl. Dimensions or Volume) <b>ORANGES IN CARTONS 1.25 CU FT/CTN</b>			These commodities, technology or software were exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to U.S. Law Prohibited.				
Prepaid <b>12240.00</b>			Weight Charge		Collect		
Valuation Charge			Other Charges <b>AGT:</b>				
Tax			<b>DUE CARR: \$.10 FSCH</b>		<b>720.00</b>		
Total Other Charges Due Agent			Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the goods described hereon is properly described by name and is in accordance with the applicable Dangerous Goods Regulations.				
Total Other Charges Due Carrier <b>720.00</b>			<b>FRESH ORANGE EXPORTER 123 FIRST STREET AMERICAN CITY, U. S. A. 10000</b>				
Total Prepaid <b>12960.00</b>			<b>J. E. LOWDEN &amp; CO. AS AUTHORIZED AGENTS FOR, ISSUING CARRIER.</b>				
Contract Dimension Rates			CO-Charges in Dest. Currency		<b>13 MAR 97 SAN FRANCISCO AIRPORT</b>		
For Carrier's Use only at Destination			Charges at Destination		Executed on (date) at (place) <b>D. ENBERG</b> Carrier or its Agent		
			Total Collected Charges		<b>SQ AIRHAWB SFO-001974732</b>		

Source: J.E. Lowden & Company

## Methods of Payment

When deciding which method or combination of methods of payment to use, the seller must weigh the risks and costs involved. The buyer doesn't want to tie up capital on product that it doesn't yet possess, which means that the seller can lose the sale if its competitors are willing to offer more attractive terms. On the other hand, the seller needs assurances that the buyer won't default on payment once it has received the goods. Companies need to develop an international credit policy that does not impede sales, but protects against loss. By answering the following questions, the seller can evaluate which payment options it can afford to offer the customer.

- Can the sale be made without offering credit?
- Does the buyer have a good credit history?
- What are conditions (i.e., market or political stability) in the buyer's country?
- What is company policy on extending credit?
- Can the seller offer credit and still make a profit?
- Can the business survive if it does not get paid?

Once the seller has determined the risks its company can afford to take, it's time to evaluate the risks associated with the more common methods of payment. Consulting with a qualified international banker at this time can help the seller make an informed selection. Ranked in order of risk from the seller's perspective, from the most secure to the least secure, the more common methods of payment are:

- Cash in advance
- Standby letter of credit
- Commercial letter of credit
- Documentary collection
- Open account
- Mixed methods
- Additional payment methods

The chart at the end of this section highlights the more common methods of payment and their associated risks.

### Cash in Advance

Cash in advance is typically considered the safest method of collecting payment for the seller. Cash in advance can take the form of a wire transfer or check. An international wire transfer is the preferred method, because it allows for quick receipt of good funds.

Sellers should provide clear routing instructions to the buyer when using an international wire transfer including the name and address of the receiving bank and branch, the bank's SWIFT, Telex, and ABA numbers, and the seller's name and address, bank account title, and account number.

Collecting payment using an international check is a less attractive option than wire transfer because it can result in lengthy delays of final receipt of good funds. If the foreign buyer pays by check, made payable in U.S. dollars and drawn on a U.S. bank, the collection process is the same as any U.S. check. If, however, the check is in a foreign currency or drawn on a foreign bank, the collection process becomes more complicated and can delay the availability of funds. There is also a risk that any check may be returned due to insufficient funds in the buyer's account. This can result in a charge-back and possible overdraft charges in the buyer's account.

An additional factor to consider is that advance payment creates cash flow problems and increases risks for the buyer. If the competition is willing to extend credit, the buyer may go elsewhere.

### Commercial Letters of Credit

A letter of credit (L/C) is a commitment or promise from the buyer's bank to pay the seller once the seller has met all the terms and conditions of the letter of credit. L/Cs are irrevocable, which means that once the L/C is established it cannot be changed without the consent of all parties.

The L/C more evenly distributes risk between the seller and buyer. The seller is assured of payment when the conditions of the L/C are met and the buyer is assured of receiving the goods ordered. It is a commonly used method of payment, especially when the seller/buyer relationship is a new one.

The L/C is, however, not without disadvantages. If any discrepancies exist in the documents required by the L/C, the buyer has the option to approve the discrepancies and pay for the shipment or reject the shipment. A rejected shipment means that the seller must quickly locate a new buyer, re-negotiate with the buyer, usually at a lower price, or pay for the shipment to be returned. An L/C also adds to the cost of the product

and can tie up the buyer's working capital or credit line prior to final payment.

A word of advice: when using an L/C, the seller should always have its international bank and its freight forwarder carefully scrutinize the L/C. They can help you determine if the L/C is legitimate, if all the terms can be met, and all the necessary bases are covered.

There are four parties formally involved in the collection of payment using an L/C:

- Buyer or applicant
- Applicant's bank or issuing bank
- Beneficiary's bank, which can act as an advising bank or confirming bank
- Seller or beneficiary

**Applicant**—The applicant (buyer) applies to its bank for the issuance of an L/C. The applicant must have a credit relationship with the issuing bank or pay cash.

**Applicant's bank**—The applicant's bank, or issuing bank, issues the L/C. The applicant's bank verifies that all documents comply with the terms and conditions of the L/C and pays the seller.

**Beneficiary's bank**—The beneficiary's bank can act as an advising bank and/or confirming bank. An advising bank is the beneficiary's bank in the U.S. It verifies that the L/C is authentic and notifies the beneficiary of its receipt. The advising bank also receives the documents from the beneficiary and forwards them on to the issuing bank. However, the advising bank has no liability for payment of the L/C.

At the beneficiary's request, an advising bank can add its confirmation to the L/C. This means that the confirming bank adds its promise to pay the beneficiary for documents presented in compliance with the terms and conditions of the L/C. The confirming bank charges a fee for this service, based on its perception of the credit risk of the issuing bank. The beneficiary would request this service if it feels that there is a risk of not receiving payment from the issuing bank, due to country or bank risk issues.

**Beneficiary**—The seller is called the beneficiary. The beneficiary is responsible for the collection, presentation, and accuracy of the documents required by the L/C.

A confirmed irrevocable L/C follows these steps:

1. After the terms of sale have been agreed upon, the buyer/applicant arranges for its bank to open an L/C.
2. The applicant's bank prepares an irrevocable L/C that includes shipping instructions.
3. The issuing bank sends the L/C to a U.S. bank, requesting confirmation.
4. The confirming bank in the U.S. prepares a letter of confirmation and delivers it to the beneficiary along with the irrevocable L/C.
5. The exporter/beneficiary and the beneficiary's bank and freight forwarder carefully review the L/C. The beneficiary verifies with its freight forwarder that the shipping dates can be met. If any of the terms or conditions in the L/C cannot be met, the beneficiary contacts the buyer/applicant immediately.
6. The exporter makes arrangements with the freight forwarder for the goods to be delivered to the port or airport.
7. Once the terms of the L/C have been met, the freight forwarder completes the documents required by the L/C.
8. The beneficiary or freight forwarder presents the required documents to the confirming bank.
9. The confirming bank reviews the documents. If the documents are in order and fully comply with the L/C, the confirming bank forwards them to the issuing bank for review and transmittal to the buyer/applicant.
10. The buyer/applicant, or its customs broker, receives from the issuing bank the documents necessary to claim title to the goods.
11. The confirming bank pays the beneficiary as specified in the L/C.

For more information on L/Cs, consult Uniform Customs and Practices for Documentary Credits (ICC Publication No. 500) or a qualified international banker.

### Standby Letter of Credit

As with the letter of credit, the standby letter of credit is a commitment or promise from the buyer's bank to pay the seller once the seller has met all the terms and conditions of the standby letter of credit. The difference is that the standby letter of credit is a guarantee of payment from the bank only if the buyer defaults on the payment. The buyer pays on open account or credit terms. Should the buyer default, the seller presents to the bank a sight draft and a written statement certifying that the buyer has failed to make payment on the shipment secured by the standby letter of credit

and collects payment from them. The use of a standby letter of credit adds a bank guarantee of payment at a lower cost than payment collection using a letter of credit.

### **Documentary Collection**

To collect payment from a foreign buyer using documentary collection, the seller sends a draft or other demand for payment with the related shipping documents through bank channels to the buyer's bank. The bank releases the documents to the buyer upon receipt of payment or promise of payment. The banks involved in facilitating this collection process have no responsibility to pay the seller should the buyer default. Documentary collection carries the risk that the buyer will not or cannot pay for the goods upon receipt of the draft and documents. If this occurs, it is the burden of the seller to locate a new buyer or pay for return shipment.

Documentary collections are best considered when shipping by ocean freight. This is because the ocean bill of lading (b/l) is a negotiable document and acts as title to the goods. The steamship company will not release the shipment from the port unless the buyer has the original b/l, and the buyer cannot get the original b/l unless the buyer pays the bank. In the case of air shipments, the b/l is not a negotiable document, does not act as title to the goods, and the benefit of using a documentary collection is lost.

**Drafts**—A draft (or bill of exchange) is a written order by one party directing a second party to pay to the order of a third party. Drafts are negotiable instruments, easily transferable from one party to another. There are two types of drafts: sight drafts and time drafts.

**Sight Drafts**—In the case of a sight draft, once the goods have been shipped, the seller signs the original bill of lading and delivers it to the bank along with the sight draft, invoices, and other supporting documents required by the buyer and destination country, to be forwarded to the buyer's bank. The buyer's bank then notifies the buyer that it has received the documents. When the buyer pays the sight draft, the bank releases the bill of lading, passing title of the goods to the buyer.

**Time Drafts**—A time draft requires payment within a certain time after the buyer accepts the draft and receives the goods. By signing and writing "accepted"

on the draft, the buyer is expected to pay within the stated time period. A buyer can delay payment by delaying acceptance of the draft or refusing to pay at maturity. In most countries, an accepted time draft is stronger evidence of debt than an unpaid invoice.

### **Open Account**

Under an open account, collection of payment is the same as in cash in advance, wire transfer, or check. The difference is in the timing of collection. The exporter bills the buyer, who is expected to pay under agreed terms at a future date. Open account is a low-risk method of payment for the buyer and many large companies will buy only on open account. Due to the high risk involved for the seller, the seller must be confident that the buyer is well established, has a long and favorable payment record, has good credit, and is legally able to convert currency into U.S. dollars. Collection on delinquent payments under open account is difficult and costly due to the lack of documents and banking channels.

### **Mixed Methods**

The payment options discussed in this section are not mutually exclusive. It is possible, and frequently practiced, that a seller will use a combination of payment methods. For example: the seller may require 50 percent of the payment as cash in advance using a wire transfer and the remaining 50 percent documentary collections using a sight draft.

### **Additional Methods of Payment**

**Credit Card**—U.S. exporters who sell directly to the consumer may select credit cards as a viable method of payment. The rules governing credit card transactions differ from domestic use to international use. Exporters should check with their credit card company(s) for specific rules on international use of credit cards.

**Consignment**—Under consignment, the foreign distributor sells goods on behalf of the exporter. The exporter does not receive payment until the distributor sells the goods and transfers title of the goods. If the foreign distributor is unable to sell the goods, the exporter must pay for the return shipment. This method of payment is risky for the exporter.

**Countertrade and Barter**—Countertrade or barter may be necessary when selling to companies that



cannot obtain convertible currency. In countertrade, the “buyer” agrees to undertake specified initiatives that compensate and benefit the “seller.” Barter is the exchange of goods or services between two parties.

### **Currency of Payment**

The simplest currency of payment for U.S. exporters is U.S. dollars. When quoting prices and requiring payment in U.S. dollars, exporters are placing the burden and risk of foreign currency conversion on the buyer. On the other hand, some U.S. exporters knowledgeable in foreign exchange find it profitable to accept payment in other currencies. If the shipment’s value is large enough; i.e., US\$25,000-\$50,000 or more, it may be possible to hedge against the foreign exchange risk. Experienced international bankers can offer advice on foreign exchange risks and offer suggestions on how to hedge against those risks.

## International Payment Instruments Comparison Chart

Payment Method	Features	Advantages	Disadvantages
Wire Transfer	<ul style="list-style-type: none"> <li>❖ Fully electronic means of payment</li> <li>❖ Uses correspondent bank accounts and Fed Wire</li> <li>❖ U.S. Dollars and foreign currencies</li> <li>❖ Same convenience and security as domestic wires</li> <li>❖ Pin numbers for each authorized individual</li> <li>❖ Repetitive codes for frequent transfers to same Beneficiaries</li> </ul>	<ul style="list-style-type: none"> <li>❖ Fastest way for Beneficiary to receive good funds</li> <li>❖ Easy to trace movement of funds from bank to bank</li> </ul>	<ul style="list-style-type: none"> <li>❖ Cost is usually more than other means of payment</li> <li>❖ Funds can be hard to recover if payment goes astray</li> <li>❖ Intermediary banks deduct charges from the proceeds</li> <li>❖ Details needed to apply funds received for credit management purposes are often lacking/insufficient</li> <li>❖ Impossible to stop payment after execution</li> </ul>
Foreign Checks	<ul style="list-style-type: none"> <li>❖ Paper instrument that must be sent to Beneficiary and is payable in Beneficiary's country</li> <li>❖ Uses account relationships with foreign correspondent banks</li> <li>❖ Available in U.S. Dollars and all major foreign currencies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Convenient when Beneficiary's bank details are not known</li> <li>❖ Useful when information/documentation must accompany payment (subscriptions, registrations, reservations, etc.)</li> <li>❖ Relatively easy to stop payment if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Mail or courier delivery can be slow</li> <li>❖ Good funds must still be collected from the drawee bank</li> <li>❖ If payable in foreign currency, value may change during the collection period</li> <li>❖ Stale dating rules differ in various countries</li> </ul>
Commercial Letters of Credit	<ul style="list-style-type: none"> <li>❖ Bank's credit replaces Buyer's credit</li> <li>❖ Payment made against compliant documents</li> <li>❖ Foreign bank risk can be eliminated via confirmation of a bank in Beneficiary's country</li> <li>❖ Acceptance credits offer built-in financing opportunity</li> </ul>	<ul style="list-style-type: none"> <li>❖ Rights and risks of Buyer and Seller are balanced</li> <li>❖ Seller is assured of payment when conditions are met</li> <li>❖ Buyer is assured of receiving the goods ordered</li> <li>❖ Confirmation eliminates country risk and commercial risk</li> </ul>	<ul style="list-style-type: none"> <li>❖ More costly than other payment alternatives</li> <li>❖ Issuance and amendments can take time</li> <li>❖ Strict documentary compliance by Seller is required</li> <li>❖ Reduces applicant's credit facilities</li> </ul>
Standby Letters of Credit	<ul style="list-style-type: none"> <li>❖ Powerful instrument with simple language</li> <li>❖ Increasingly popular in U.S. and abroad</li> <li>❖ Foreign bank risk can be eliminated via confirmation of a bank in Beneficiary's country</li> <li>❖ "Evergreen" clauses shift expiry risk from Beneficiary to issuer</li> </ul>	<ul style="list-style-type: none"> <li>❖ May be cheaper than Commercial Letter of Credit</li> <li>❖ More secure than open account or Documentary Collection</li> <li>❖ Discrepancies less likely than under Commercial L/C</li> <li>❖ Confirmation eliminates country risk and commercial risk</li> </ul>	<ul style="list-style-type: none"> <li>❖ Weak language can give Beneficiary unintended advantages</li> <li>❖ More costly than Documentary Collections</li> <li>❖ Reduces Buyer's credit facilities</li> </ul>
Documentary Collections	<ul style="list-style-type: none"> <li>❖ Seller uses banks as agents to present shipping documents to Buyer against Buyer's payment or promise to pay</li> <li>❖ With Direct Collection Letter (DCL), Seller ships and sends shipping documents directly to Buyer's bank, which collects and remits funds to Seller's bank</li> </ul>	<ul style="list-style-type: none"> <li>❖ More secure than open account</li> <li>❖ Cheaper and less rigid than Commercial L/C</li> <li>❖ No strict compliance rules apply</li> <li>❖ No credit facilities required</li> </ul>	<ul style="list-style-type: none"> <li>❖ Country risk and commercial risk exist</li> <li>❖ No guaranty of payment by any bank</li> <li>❖ No protection against order cancellation</li> <li>❖ No built-in financing opportunity as with Commercial L/C</li> </ul>

Source: *Firstar Bank*

## Exporter's Checklist

### For Reviewing a Letter of Credit in Favor of the Seller

- \_\_\_\_\_ Is the L/C irrevocable?
- \_\_\_\_\_ Has the credit been confirmed, if requested?
- \_\_\_\_\_ Is the type of credit (revolving, transferable, etc.) as agreed?
- \_\_\_\_\_ Is the amount of the credit sufficient to cover all costs permitted by the terms of the contract? Are the incoterms correct? Have the terms "about" or "approximately" been included?
- \_\_\_\_\_ Is the credit available with your bank, freely negotiable, or available with any bank, or is it restricted to the issuing bank or any other designated bank?
- \_\_\_\_\_ Are the descriptions of the goods and unit prices, if any, in accordance with the sale contract? Have the terms "about" or "approximately" been included, if requested?
- \_\_\_\_\_ Are transshipment and partial shipments allowed, if necessary?
- \_\_\_\_\_ Are the points of dispatch/taking in charge/loading on board of the goods, as the case may be, and of discharge/final destination as agreed?
- \_\_\_\_\_ Do the shipping and expiry dates and the period for presentation of documents after issuance of the transport document allow sufficient time for processing the order, effecting shipment, and presenting the documents to the bank?
- \_\_\_\_\_ Are the provisions for insurance in accordance with incoterms?
- \_\_\_\_\_ Can the necessary documents be obtained in the form required and in the timeframe allowed by the credit?
- \_\_\_\_\_ Have any unacceptable conditions been added to the credit without your approval; e.g., an inspection certificate to be provided by the buyer?

# Commercial Letter of Credit

## Common Discrepancies Which Can Lead to Non-payment

### General

1. Documents inconsistent with each other.
2. Description of goods on invoice differs from that in the credit.
3. Marks and numbers differ between the documents.
4. Absence of documents called for in the credit.
5. Incorrect names and addresses.

### Draft (Bill of Exchange)

1. Amount does not match invoice.
2. Drawn on wrong party.
3. Not endorsed correctly.
4. Drawn payable on an indeterminable date.

### Transport Documents

1. Shipment made between ports other than those stated in the credit.
2. Signature on bill of lading does not specify on whose behalf it was signed.
3. Required number of originals not presented.
4. Bill of lading does not evidence whether freight is prepaid or collect.
5. No evidence of goods actually "shipped on board."
6. Bill of lading incorrectly consigned.
7. "To order" bills of lading not endorsed.

### Insurance

1. Insurance document presented of a type other than that required by the credit.
2. Shipment is underinsured.
3. Insurance not effective for the date in the transport documents.
4. Insurance policy incorrectly endorsed.

### Deadlines

1. Late shipment.
2. Late presentation of documents.
3. Credit expired.

Source: *Firststar Bank*

# Sample Letter of Credit—SWIFT Format

507 july 95 09:13

page: 2355

LP00

\*\*\* HARDCOPY msg id 0131-00010-00333 \*\*\*

RECEIVED FROM: IMPORTER'S COMMERCIAL BANK  
TAIPEI, TAIWAN

sent to :

SELLER'S U.S. COMMERCIAL BANK  
INTERNATIONAL DIVISION  
SAN FRANCISCO, CA

date : 07 july 95 time : 09.13 issue of a documentary credit \*\*urgent\*\*

:27 /sequence of total :1/1  
:40a/form of documentary credit :IRREVOCABLE  
:20 /documentary credit number :DOC.500  
:31C/date of issue :950707 USA  
:31D/date and place of expiry :950921 USA  
:50 /applicant :IMPORTER'S COMPANY NAME  
IMPORTER'S COMPANY ADDRESS  
TAIWAN  
:59 /beneficiary :EXPORTER'S COMPANY NAME  
EXPORTER'S COMPANY ADDRESS  
USA  
:32B/currency code amount  
currency code : USD US DOLLAR  
amount : #100,000.00#  
:39B/maximum credit amount :NOT EXCEEDING  
:41D/available with/by-name, address :ANY BANK  
BY NEGOTIATION  
:42C/drafts at :SIGHT  
:42D/drawee - name and address :IMPORTER'S COMMERCIAL BANK  
TAIWAN  
:43P/partial shipments :PROHIBITED  
:43T/transshipment :PROHIBITED  
:44A/on board/disp/taking charge :USA PORT  
:44B/for transportation to :TAIWAN PORT  
:44C/latest date of shipment :950831  
:45A/descr goods and/or services :FUJI APPLES  
CIF TAIWAN  
:46B/documents required :+COMMERCIAL INVOICE AND THREE COPIES.  
+FULL SET CLEAN ON BOARD BILLS OF LADING, MARKET FREIGHT  
PREPAID CONSIGNED TO BUYER.  
+INSURANCE CERTIFICATE.  
+CERTIFICATE OF ORIGIN.  
+USDA INSPECTION CERTIFICATE.  
:47A/additional conditions :+ALL DRAFTS MUST INDICATE: DRAWN UNDER IMPORTER'S  
COMMERCIAL BANK TAIWAN LETTER OF CREDIT NUMBER DOC.500  
:48 /period for presentation :DOCUMENTS ARE TO BE PRESENTED WITHIN 21 DAYS AFTER  
SHIPMENT BUT WITHIN L/C VALIDITY.  
:49 /confirmation instructions :WITH

:78 /instructions to pay/acc/neg bk

:ALL REQUIRED DOCUMENTS ARE TO BE SENT TO IMPORTER'S COMMERCIAL BANK, TAIPEI, TAIWAN IN ONE SET, VIA COURIER CONFIRMING THAT ALL TERMS AND CONDITIONS HAVE BEEN COMPLIED WITH. DOCUMENTS ARE TO INCLUDE YOUR SETTLEMENT INSTRUCTIONS.

:72 /sender to receiver information

:THIS CREDIT IS SUBJECT TO THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS ICC PUBLICATION NO. 500, 1993 REVISION.

-AUT/\*\*\*\* Authentication Result

\*END

## Swift Field Descriptions

Most letters of credit are issued by electronic means. The following is a list of the fields in a SWIFT MT 700 message (Issuance of Documentary Letter of Credit). Only a few fields are mandatory; most are optional and depend on the nature of the transaction.

27	Sequence # (Page number within the total sequence)
40A	Form of Documentary Credit (Irrevocable or Revocable)
20	Issuing bank's reference number
31C	Date of issue
31D	Date and place of expiry
51A/D	Applicant bank/applicant reference number
50	Applicant
59	Beneficiary
32B	Currency code and amount
39A	Percentage credit amount tolerance
39B	Maximum credit amount
39C	Additional amounts covered
41A/B	Available with (bank)...by (payment, negotiation, acceptance)
42C	Drafts at (sight, time, etc.)
42A	Drawn on (what party)
42M	Mixed payment details (part sight, part time)
42P	Deferred payment details
43P	Partial shipments (allowed or prohibited)
43T	Transshipments (allowed or prohibited)
44A	Loading on board/dispatch/taking in charge from/at...
44B	For transportation to...
44C	Latest date of shipment
44D	Shipment period
45A	Description of goods and/or services
46A	Documents required
47A	Additional conditions
71B	Charges (which party pays)
48	Period for presentation (within L/C validity)
49	Confirmation instructions (with/without)
53A	Reimbursement bank
78	Instructions to paying/accepting/negotiating bank
57A	"Advise Through" Bank
72	Sender to receiver information

# Insurance

## Cargo Insurance

The purpose of cargo insurance is to protect the cargo owner's financial interests while the cargo is exposed to the risks of transit. Air and ocean carriers provide limited coverage while a shipment is in their possession. The bill of lading states the liability that the carrier assumes. It is critical that the shipper understand that the carrier is not responsible for such perils as "Acts of God." When filing a claim with a carrier, the shipper must prove the cause of loss, that the loss occurred while in the carrier's possession, and that the carrier is directly liable for the loss.

**Airline**—The airlines are liable up to \$9.07 per pound or \$20 per kilo on shipments to foreign destinations and \$0.50 per pound on domestic shipments. Shippers have the option of declaring a higher value for the shipment and paying higher freight charges based upon this declared value.

**Ocean Carrier**—Similar to the airlines, ocean carriers provide a limited amount of coverage, \$500 per customary shipping unit (CSU), as stated on the back of the bill of lading. The CSU is generally interpreted as the ocean container. This coverage is rarely sufficient in covering the cost of the goods shipped.

Outlets for obtaining cargo insurance are:

- Through a freight forwarder.
- From an insurance company specializing in ocean and air cargo
- Insurance.

**Freight Forwarder**—Most freight forwarders have open cargo policies under which they will arrange coverage on behalf of their clients. These open cargo policies are called "house policies," which the freight forwarder offers as a value-added service to its clients. House policies cover both air and ocean cargo.

**Insurance Company**—The second means of obtaining air cargo and ocean marine insurance is through an independent agent or marine insurance broker. The agent or broker often represents insurance companies that specialize in ocean and air cargo insurance.

The insurance agent can offer a range of coverage options. Depending upon the size and scope of the shipper's operation, the marine insurance policy will

come in the form of an open cargo policy or a special marine policy.

1. **Open Cargo Policy**—Open cargo policies are used when the shipper has a continuous flow of goods being shipped over a long period of time. The open cargo policy contains no expiration date and provides automatic coverage when the shipper must insure the goods. The policy is customarily issued on a warehouse-to-warehouse basis that provides the shipper continuous coverage throughout the normal course of transit.

Open cargo policies can also be tailored to meet a shipper's many specific needs, such as returned or refused shipments, warehouse exposures outside the scope of the policy, inland transit, and shipments sold on terms other than under CIF.

Since the policy provides automatic coverage, it usually lists the insured party's name, the cargo covered, the insuring conditions, areas of the world that coverage is granted, and the insurance rates. The shipper is required to submit a monthly report of all shipments that have occurred under the policy and to pay a premium on those shipments at the agreed upon insurance rates. Depending on the shipper's needs, the open cargo policy may offer the broadest possible insurance terms for the lowest price.

2. **Special Marine Policy**—The special marine policy is designed to provide coverage on individual shipments. This policy provides the same coverage available under the open cargo policy. However, it does not provide automatic coverage. Once the shipment has been completed and coverage has ceased, this policy automatically terminates.

## Coverage

There are three common types of cargo coverage: named perils, broad named perils, and all risks. Named perils coverage is written with clauses that specify what portion of the covered loss will be paid in the case of damage. These clauses are Free of Particular Average (FPA) and With Particular Average (WA or WPA). (In insurance terminology, "WPA" means "partial loss.") A policy written with a FPA clause does



not pay for partial damage sustained by cargo. The WPA clause pays for partial damage to cargo caused by named perils but is subject to a deductible specified in the policy.

- A. *Named Perils*—This coverage includes perils of the sea, fires, jettisons, barratry, explosions, hurricanes, earthquakes, and other risks. Its coverage can include the FPA or WPA clauses.
- B. *Broad Named Perils*—This policy frequently includes a WPA clause and covers a greater number of risks, such as theft, pilferage, non-delivery, hook damage, fuel oil damage, damage by contact with other cargo, breakage, and leakage.
- C. *All Risks*—This is the broadest type of standard policy, covering all physical loss or damage from any external causes. This coverage does not include loss caused by improper packing, abandonment of cargo, rejection of goods by Customs, failure to pay or collect accounts, inherent vice, employee conversion or dishonesty, loss in excess of policy limits, barge shipments, war, strikes, riots, trade losses, or loss of market.

Many of the perils not covered by the All Risks Policy can be written into the policy for an additional cost. In the case of special cargos or circumstances, the agent or broker can work with the underwriter to modify the policy.

Two other clauses always incorporated into a marine policy are “general average” and “salvage charges.” The “general average” clause stipulates that if any shipper sustains loss or damage for the general benefit of the vessel, then all parties shipping product on that vessel must contribute proportionately to reimburse the sufferer for the loss.

“Salvage charges” are paid to a third party that renders services in a time of cargo peril. These charges are paid proportionately by all those who benefited from the service.

The value of the cargo is generally determined by the cost of the cargo, insurance, and freight as indicated on the exporter’s invoice, with an additional 10 percent.

**Contingency Insurance**—When product is sold under terms that require the buyer to provide insurance,

experienced exporters often choose to purchase contingency insurance. Contingency insurance acts as a backup insurance for the seller in case the insurance provided by the buyer is not sufficient to cover the value of the shipment.

### Filing a Claim

In the case of international shipments, the consignee (the receiver) will most likely be the first to discover any damage to, or loss of, a shipment. The receiver must thoroughly inspect each shipment and note any signs of damage or loss on the delivery receipt. Even if no outward evidence of loss or damage exists, it is important to inspect the entire shipment as soon as possible for any hidden damage. When loss or damage is discovered, the consignee must take all reasonable actions to minimize the loss or damage. Any reasonable expenses in doing so will be reimbursed by the insurer. The shipping container, packing materials, damaged merchandise, and shipping documents should be kept as evidence of the loss and for claim purposes.

If the cargo is damaged or if any damage or loss is suspected, the insured party must immediately file a claim with the carrier to avoid filing deadlines. If the insured fails to take this step, or signs a waiver of carrier responsibility, it may result in the loss of coverage. The letter of claim to the carrier should include the following information:

- Company name of ocean or air carrier
- Bill of lading or air waybill number
- Voyage or flight number
- Destination arrival date
- Container number
- Description of cargo
- Dollar amount of claim

The consignee or insured must contact the nearest claim agent so a survey of damage can be arranged. The carrier or carrier’s agent should be notified of the time and location of the survey so he or she can be represented. When filing a claim, the assurer may request some or all of the following documents:

- Non-negotiable copy of the bill of lading or air waybill (both front and back)
- Certificate of insurance or declaration of insurance
- Copies of letters of claims filed with carriers
- Correspondence or verbal advice from carriers
- Commercial invoice

- Packing list
- Evidence of loss or damage
- Delivery receipt
- Inland waybill
- Consignee's receiving report
- Customs documents
- Confirmation of nondelivery by carrier
- Survey report
- Valued inventory
- Repair estimates (if applicable)
- Sue & labor reimbursements
- Other (as specified by the assurer)

Under the "general average" clause in a cargo insurance policy, a shipper can be held partially financially responsible for losses incurred by another shipper if that loss was incurred to benefit the good of the voyage. An example is when cargo is jettisoned to save the ship and remaining cargo. When filing this type of claim, the shipper should contact the claims agent and provide the following documents:

- Commercial invoice
- Ocean bill of lading showing freight charges
- Special cargo policy or declaration

## Maintaining Product Quality During Transportation

In addition to obtaining competitive freight rates and services, a shipper should ensure that the product will arrive in excellent condition. Of particular concern are products of a perishable nature, such as frozen and chilled foods, as well as processed and packaged foods, drinks, and juices. Important considerations include:

- Effective packaging and labeling;
- Temperature, humidity, and other environmental controls;
- Well-maintained transportation equipment; and
- Proper loading, in-transit monitoring, and unloading.

Under the best circumstances, product quality can be only maintained, not improved, during transportation. Initial product quality should be the highest possible. Products in top-quality condition:

- Have a longer shelf life;
- Allow more time for transportation, storage, and marketing;
- Satisfy importers, brokers, and consumers;
- Increase repeat sales and profits; and
- Help expand markets.

Exporters should keep in mind that products must be protected from:

- Rough handling during loading and unloading;
- Compression from the overhead weight of other product containers;
- Impact and vibration during land, ocean, and air transportation;
- Rolling, pitching, yawing, heaving, swaying, and surging during ocean transportation;
- Loss or gain of moisture to or from the surrounding air;
- Higher or lower than recommended temperature; and
- Cross-contamination or odors from other products or residues.

By selecting and packing only top-quality products, shippers can help ensure good arrival condition. Effective packaging, environmental controls, and proper transportation equipment are essential.

## Effective Packaging and Labeling

Proper packaging of agricultural products is essential to maintaining quality during transportation and marketing. Packaging serves to enclose the product and facilitate handling. Labeling provides required information and a further opportunity to position the product in the market through attractive graphics. Shipping high-quality, high-value, perishable products in poor-quality packaging can lead to damage, decay, low prices, or outright rejection by the buyer. Improper labeling can also lead to delays and product loss.

Packaging must withstand:

- Rough handling during loading and unloading;
- Compression from the overhead weight of other containers;
- Impact and vibration during transportation; and
- High humidity during precooling, transit, and storage.

Packaging materials are chosen on the basis of the product and environmental considerations. Factors to be considered are method of packing, temperature, humidity, desired atmosphere around the product, packaging strength, cost, availability, buyer specifications, graphics, labeling, freight rates, and government regulations. Packaging manufacturers, foreign buyers, wholesale markets, retail stores, packaging magazines, and consultants are an important source of information on current packaging trends and desires.

All packaging should be recyclable or reusable, and the necessary amount of material should be used to protect the product. The options of incinerating packaging waste or shipping waste to landfills are being reduced throughout the United States and Europe. Mandatory recycling programs, packaging bans, and solid waste reduction programs have been established in many countries.

Packaging also should be standardized to facilitate unit loading on standard-size, reusable pallets in use in the United States, Europe, and other countries. Pallet handling and leasing companies have been established in response to economic as well as environmental concerns.

Boxes should be sized and filled in accordance with the importer's or buyer's desires. Boxes that are very wide and weigh more than 20 kg (44 lb) encourage rougher handling, product damage, and container failure.

Excessive weights and damaged packaging are common complaints of importers of U.S. meat products who receive boxes weighing up to 45 kg (100 lb). In the Netherlands, for example, a single worker does not have to lift over 15 kg (33 lb) unassisted, in accordance with labor regulations and occupational safety concerns.

Overfilling causes product damage and excessive bulging of the box, which leads to reduced compression strength and container failure. Underfilling also may cause product damage. The product may be bruised as it moves around inside the box during transport and handling or during crushing of the available headspace.

Widely used packaging materials include:

- Fiberboard—Pallets, slipsheets, bins, boxes (glued, stapled, interlocking), lugs, trays, flats, dividers, and partitions.
- Wood—Pallets, bins, crates (wirebound, nailed), baskets, trays, and lugs.
- Paper—Bags, sleeves, wraps, liners, pads, excelsior, and labels.
- Plastic—Pallets, bins, boxes, trays, bags (mesh, solid), containers, sleeves, film wraps, liners, coatings, dividers, and slipsheets.
- Polystyrene—Foam boxes, trays, lugs, sleeves, liners, dividers, and pads.

**Fiberboard Boxes**—Fiberboard boxes are the most widely used packaging, due to their versatility and recyclability. There are many fiberboard box styles and sizes. A minimum 19.3 kg/cm<sup>2</sup> (275 lb/in<sup>2</sup>) bursting-test-strength or 7.86 kg/in (44 lb/in) width edge crush test fiberboard is recommended for boxes intended for export. The strength is needed for the handling, transport conditions, and high humidity the boxes must endure. Many boxes are now certified with an edge crush test instead of the bursting strength test. This information is available from the packaging supplier and stamped on each box. Foreign buyers or importers should be consulted about the size, pack, and box style desired.

Fiberboard boxes for products that are precooled in the box, packed wet, or packed with ice are wax-impregnated or coated with water-resistant material. Wax-treated fiberboard is generally not considered recyclable, so polyethylene and other coatings have been developed instead.

Water-resistant coatings may be needed because the compression strength of untreated fiberboard can be reduced by more than one-half in conditions of high relative humidity common in refrigerated environments. In addition to maintaining box strength, coatings help to reduce the loss of moisture from the product to the fiberboard or weakening of the fiberboard from moisture from the product. All glued boxes should be made with a water-resistant adhesive that also is recyclable.

Specially coated modified atmosphere fiberboard packaging has been developed to slow product respiration rate and eliminate the need for ice and wax coatings in packages of fresh broccoli and other products. Film wraps of individual commodities and film wraps of fiberboard boxes of product have also been developed with the same purpose in mind. Proper product precooling and maintenance of refrigerated product temperatures are required for modified atmosphere packaging to work as intended.

Holes are provided in fiberboard boxes of some products to provide ventilation of product heat (respiration) and allow circulation of cold air to the product when a modified atmosphere is not required. Handholds provide a means of handling boxes during loading and unloading. All holes must be designed and placed in a manner that does not substantially weaken the box.

**Wood Crates**—Wood crates and wirebound wood crates are popular with some shippers due to their material strength and resistance to high humidity and moisture damage during precooling, transit, and storage. The crates are constructed in a manner that allows a lot of air circulation around the packed product. There is concern over whether wood crates are recyclable or reusable. Machines are available to grind up wood crates for conversion into mulch or other materials, but some countries in Europe have discouraged their use. Fasteners or wire in wood crates to be recycled should be made of steel with a maximum diameter of 10 mm, to allow grinding of the crates and extraction of the fastener particles with magnets.

## Stacking

The majority of fiberboard boxes and wood crates are designed to be stacked top-to-bottom. Compression strength and product protection are sacrificed when boxes or crates are stacked on their ends or sides. Misaligned fiberboard boxes can lose up to 30 percent of their strength, while boxes that are not stacked top-to-bottom (stacked either crosswise or off-center) can lose up to 50 percent of their top-to-bottom compression strength.

Various materials are added to boxes to provide additional strength and product protection. Fiberboard trays, dividers, or partitions, and double- or triple-layer sides and ends in boxes provide additional compression strength and reduce product damage.

Pads, wraps, sleeves, and excelsior are used to reduce bruising. Pads also are used to: provide moisture, as with asparagus; absorb moisture as with retail packages of meat, poultry, and seafood; provide chemical treatment to reduce decay, as with sulfur dioxide pads for grapes; and absorb ethylene, as with potassium permanganate pads used in boxes of bananas and flowers, or oxygen in the case of some modified-atmosphere packaging.

**Plastic Film Liners or Bags**—Plastic film liners or bags are used to retain moisture, provide for a modified atmosphere, or maintain product integrity, such as in a cluster of grapes or tomatoes. Plastic with various size perforations, depending on commodity requirements, is used to let oxygen in and carbon dioxide out. Special films are used to seal the products and provide for a modified atmosphere either by allowing the product to consume oxygen, releasing carbon dioxide and therefore slow product respiration and ripening, or by flushing the package with a modified atmosphere or by vacuum packaging. This is done for bananas, strawberries, cherries, tomatoes, meat, poultry, seafood, and many other products that benefit from a modified atmosphere.

**Paper and Polystyrene Foam Liners**—Liners help to insulate the product from hot or cold temperatures when they are shipped in unrefrigerated air cargo holds and uninsulated air cargo containers. Wet paper is used to provide moisture to fresh cut herbs and flowers.

Shippers should check with the Foreign Agricultural Service (FAS) or Animal and Plant Health Inspection

Service (APHIS) for packaging materials restrictions in foreign countries, especially those made from plant parts such as wood, straw, or leaves. Some of these items are prohibited in other countries or require special documentation or quarantine treatments. Countries with phytosanitary or environmental restrictions on packaging materials include Australia, New Zealand, and the European Community. Soil also is restricted by many countries.

## Packing Methods

### Types of Packs

Types of packs include:

- **Volume Fill**—Products are placed by hand or machine into the box until the desired capacity, weight, or count is reached.
- **Tray or Cell Pack**—Products are placed in molded trays or cells which provide separation and reduce bruising.
- **Place Pack**—Products are wrapped and carefully placed in the box. This provides reduced bruising and a pleasing appearance.
- **Consumer Pack or Prepack**—Relatively small amounts of the product are packaged, weighed, and labeled for retail sale.
- **Flexible Packaging**—Each product is individually wrapped and sealed in film to reduce moisture loss and decay, and in some cases, provide for a modified atmosphere by letting oxygen in and carbon dioxide out through the design of the film layers, at a rate that slows product respiration and ripening. For some commodities the film may be treated with fungicides or other chemicals.
- **Modified Atmosphere**—Individual commodities, consumer packs, boxes, or pallet loads of commodities are sealed with special plastic film or bags and flushed with nitrogen to slow respiration, ripening, or aging of the product. In each case the packaging is formulated for a specific product.

### Packing Fresh Fruits and Vegetables

The packing of fresh fruits and vegetables is of concern due to their highly perishable nature. Growers, processors, packers, shippers, and repackers should:

- Ensure adequate sanitation during harvesting and packing to avoid contamination of produce with pathogenic organisms that can cause food-borne illness;

- Use a chlorinated wash to remove dirt, debris, and organisms present in harvest operations;
- Sort out bruised, cut, decayed, insect-infested, odd-sized, immature, or overripe items;
- Use the minimum amount necessary of fungicides/bactericides to limit decay on certain products, strictly in accordance with label instructions and foreign country restrictions;
- Use the minimum amount necessary of officially approved wax or resin coatings to reduce moisture loss on certain products, strictly in accordance with label instructions and foreign country restrictions;
- Use the minimum amount necessary of officially approved pesticides for certain products to eliminate insect pests, strictly in accordance with label instructions and foreign country restrictions;
- Remove field heat (precool) as soon as possible after harvest, and maintain the cold chain;
- Use grade standards or buyer's specifications in packing;
- Place only uniform sizes or amounts in each box;
- Place only products with a uniform level of maturity in each box; and
- Clearly mark the grade, size, weight, or count on the box, along with any other required label information, such as country of origin, exporter, importer, gross and net weights in kilograms, total number of packages, size of package in centimeters, handling marks (international pictorial symbols), cautionary marks, port of entry, pesticides, and fungicides used, or wax or resin coatings used, in a language accepted by the destination country.

Damaged fresh products can ruin an entire shipment and reduce importers' confidence in the grower and shipper. Products in this condition:

- Spread decay to other products in the load;
- Produce more ethylene gas and heat, which cause further ripening and decay; and
- Lose more water resulting in shriveling and wilting.

Packing methods for fresh produce include:

- **Field Packing**—Products are placed in fiberboard boxes or wood crates during harvesting. Some products are wrapped. The filled containers are then taken to a precooling facility to reduce field heat.
- **Shed Packing**—Products are processed or packed indoors or under cover at a central location. The product is brought from the field to the packing shed in bulk in field crates, bins, or trucks. The products

are precooled either before or after they are placed in shipping containers.

- **Repacking**—Products are taken out of one container, regraded, and placed in another. This is often done to make smaller boxes for the retailer or consumer packages.
- **Fresh-cut Processing**—Products are washed, trimmed, shredded, peeled, cut, and otherwise processed into salad mixes or ready-to-eat items under sanitary and temperature-controlled conditions using Hazard Analysis Critical Control Point (HACCP) or similar systems of quality control. These items are then placed in modified-atmosphere consumer and foodservice packages, which are then grouped in fiberboard boxes for distribution under constant refrigeration.

### **Packing Meat, Poultry, and Seafood Products**

Through careful sanitation, modified-atmosphere packaging technology, temperature control, and loading of marine containers at meat packing plants, extended shelf life of 70 days or more for chilled beef and lamb has been possible since the late 1980s. This has provided higher revenues for the meat exporter as compared with frozen product shipped by sea or chilled product shipped by air. Recently instituted HACCP procedures may help additional firms enter the export market with extended shelf-life, quality-assured chilled and frozen products.

### **Standardization**

Due to the large number of different box sizes in use, box and pallet standards have been developed by the fresh produce, frozen food, floral, and grocery industries in Europe and the United States to reduce handling damage and packaging waste. Standardized boxes can:

- Reduce box inventory for manufacturers and growers;
- Provide unit loads and more stable mixed pallet loads;
- Reduce transportation and marketing costs; and
- Use 90 to 100 percent of the pallet surface with no overhang and little underhang.

The following are standard pallet sizes:

- Standard Grocery Manufacturers Association (GMA) pallet used in the United States—1,219 by 1,016 mm (48 by 40 in).

- International Standards Organization (ISO) pallet used in Europe—1,200 by 1,000 mm (47.24 by 39.37 in).
- Europallet, also widely used in Europe—1,200 by 800 mm (47.24 by 31.5 in).

The following five box sizes that fit well on all three of the above pallets are recommended for international trade, especially in Europe.

- 600 by 400 mm
- 400 by 300 mm
- 400 by 200 mm
- 300 by 200 mm
- 200 by 150 mm

### Unit Loads

Shippers, carriers, and receivers prefer handling palletized unit loads instead of individual boxes, one at a time. Most distribution centers are set up to store palletized loads in three-tier or higher racks.

Unit loads provide for:

- Reduced handling of boxes;
- Less damage to the boxes and the products inside;
- Faster loading and unloading of transportation equipment;
- More efficient distribution center operations; and
- Reduced pilferage of products.

Unit loads may include some of the following features:

- Standard size reusable or recyclable wood pallets or slipsheets;
- Fiberboard, plastic, or wire vertical interlocking tabs between boxes;
- Boxes with holes for air circulation, which align when the boxes are stacked squarely on top of one another, corner to corner;
- Recyclable glue between boxes to resist horizontal slipping;
- Plastic netting around the pallet load of boxes; and
- Fiberboard, plastic, or metal cornerboards with plastic or metal strapping around the cornerboards and boxes.

### Pallets

Wood pallets must be strong enough to allow storage in racks. Pallets also should be capable of being reused a number of times. Provisions for forklift and

pallet jack handling are necessary. The design of the bottom of the pallet should not block air circulation.

Block-style 1,200 by 1,000 mm pallets are standard in European pallet pools and should be used for any exports to Europe. The Europallet, 1,200 by 800 mm, also is popular in some European countries. Australia uses an 1,100 by 1,100 mm pallet.

One-way pallets are increasingly being rejected by importers and receivers due to recycling and disposal costs. Product received in Europe on pallets other than the 1,200 by 1,000 mm and 1,200 by 800 mm pallets used in those countries may be required to be re-palletized at the port of entry, leading to additional handling costs, product damage, and pallet disposal costs.

Pallets must have an adequate number of top deck boards to support fiberboard boxes. Otherwise the boxes may collapse between deck boards, crush the product, or cause the entire load to lean or fall off the pallet. A sheet of fiberboard with holes for air circulation can be used to help distribute weight across the pallet.

Boxes must not overhang the edges of the pallets. Overhang can reduce the strength of fiberboard boxes by one-third. This condition can lead to collapse of the entire load, crushing of the product, and difficulty in loading, unloading, and storage in racks. On the other hand, boxes that use less than 90 percent of the pallet surface and do not align with the pallet edge can shift in transit.

Pallet loads of boxes that are not strapped or netted should have at least the top three layers of containers cross-stacked to provide stability. Some shippers use film wrap, tape, or glue on the top layers in addition to cross-stacking. The boxes must be strong enough to be cross-stacked without collapsing. Film wrap should not be used on boxes of products that need ventilation.

### Slipsheets

Slipsheets, made of sheets of fiberboard or plastic, are used by some shippers instead of pallets to reduce transportation costs. Slipsheets eliminate the cost of buying, disposing of, or returning pallets. A special forklift with a clamping device is needed to transfer slipsheet loads to and from the warehouse pallets at the shipper's and receiver's distribution center and into the trailer, container, or railcar. If this special forklift is not available, the unit loads must be transferred box by

box onto pallets, leading to costly delay and product damage.

Slipsheets made of recyclable fiberboard or plastic must be strong enough to be clamped and pulled onto the forklift tines or plate for lifting. Fiberboard slipsheets should be treated with a recyclable coating for use in wet conditions. Slipsheets used in transportation equipment should have holes for air circulation under the load. The use of slipsheets in refrigerated transportation equipment with shallow floor channels is not recommended due to the need for adequate air circulation under the load. Unit loads of boxes on slipsheets should be netted, stretch-wrapped, or otherwise secured with cornerboards and strapping.

### **Labeling and Branding**

Labeling of boxes may provide required information for export certification, identify and advertise the products, and assist receivers in storing and retrieving the boxes. Fiberboard boxes can be preprinted with colorful graphics. Wood packaging has glued, stamped, or stenciled labeling. Some high-quality fruits and vegetables are individually branded with small colorful trademark stickers. Some shippers also provide selection, storage, recipes, posters, and other point-of-sale material for the retailer or consumer.

All boxes and consumer packages should be clearly labeled, bar coded, and branded in the language accepted by the destination country. The following information should be included on boxes along with any other data required by the foreign country:

- Common name of the product;
- Net weight, count, and/or volume;
- Brand name as well as name and address of the packer or shipper;
- Country of origin;
- Size and grade, when standards are used;
- Recommended storage temperature;
- Special handling instructions; and
- Name of officially approved fungicides or bactericides used in packaging.

Each country has labeling requirements that must be followed. Labeling of consumer packages is mandatory under most national regulations. For example, the United States requires that in addition to the product name, net weight, and name and address of the manufacturer, packer, or distributor, processed items must have a nutrition label and all ingredients listed in

descending order of prominence. The Food and Drug Administration (FDA) classifies fruits and vegetables with wax or resin coatings as processed products that must be properly labeled with names of the coating displayed at the point of retail sale or on the individual items. Many processed products also are labeled with a “sell by” date or “best if used by” date.

### **Temperature, Humidity, and Other Environmental Controls**

Removal of field heat by the process of precooling to a recommended storage temperature and relative humidity is absolutely necessary to maintain the quality of fresh fruits, vegetables, plants, and cut flowers. The quality of most products will rapidly deteriorate if field heat is not removed before loading into transportation equipment. The rate of respiration and ripening increases two to three times for every 10° C (18° F) above the recommended storage temperature.

Refrigerated transportation equipment is designed to maintain temperature and should not be used to remove field heat from products packed in shipping containers. The refrigeration units also are not capable of raising or controlling the relative humidity.

A high temperature difference between the refrigeration unit evaporation coil and the product will increase the loss of product moisture. This will cause the evaporator to frost and the products to shrivel or wilt and weigh less. Most fruits and vegetables have a water content between 80 and 95 percent.

### ***Precooling Factors***

Precooling extends product life by reducing:

- Field heat;
- Rate of respiration (heat generated by the product);
- Rate of ripening;
- Loss of moisture (shriveling and wilting);
- Production of ethylene (ripening gas generated by the product); and
- Spread of decay.

The success of precooling is dependent on:

- Time between harvest and precooling;
- Type of shipping container, if product is packed beforehand;
- Initial product temperature;



- Velocity or amount of cold air, water, or ice provided;
- Final product temperature;
- Sanitation of the precooling air or water to reduce decay organisms; and
- Maintenance of the recommended temperature after precooling.

Precooling should occur as soon as possible after harvest. Harvesting should be done in early morning hours to minimize field heat and the refrigeration load on precooling equipment. Harvested products should be protected from the sun with a covering until they are placed in the precooling facility.

Many products are field or shed packed and then pre-cooled. Wood wirebound or nailed crates and waxed or coated fiberboard boxes are used for packed products that are pre-cooled with water or ice after packing. This process is being modified in response to the demand for recyclable boxes.

Precooling products packed in boxes and stacked in unitized pallet loads is especially important as air circulation around and through the packaging may be limited during transportation and storage.

Precooling is particularly important for products that produce a lot of heat. The following are examples of products that have high respiration rates and short transit and storage lives:

artichokes	carrots, bunched	okra
asparagus	corn, sweet	parsley
beans, lima	endive	peas
beans, snap	kale	raspberries
bean sprouts	lettuce	spinach
blackberries	mushrooms	strawberries
broccoli	onions, green	watercress
brussels sprouts		

### ***Precooling Methods***

The choice of precooling method depends on the nature, value, and quantity of the product, as well as the cost of labor, equipment, and materials. Precooling methods include:

- **Room Cooling**—Boxes of products are stacked in a refrigerated room. Some products are misted or sprayed with water during room cooling.

- **Forced-Air Cooling or Wet Pressure Cooling**—Air is drawn through stacks or unit loads of boxes of products in a refrigerated room. For some products, water is added to the air.
- **Hydrocooling**—Products are flushed with ice water in bulk tanks, bins, or boxes.
- **Vacuum Cooling**—Heat is removed from products packed in boxes by drawing a vacuum in a chamber.
- **Hydrovacuum Cooling**—Moisture is added to products packed in boxes before or during the vacuum process to speed the removal of heat.
- **Package-Icing**—Slush or crushed ice is injected into each box of product. Some operations use bulk bins.

Portable ice plants, hydrocoolers, vacuum coolers, forced-air coolers, and package-icing machines are available for use in the fields. This equipment is useful for remote or small-scale operations that cannot justify investment in a fixed precooling facility. Mounted on skids, dollies, or tractor trailers, the equipment can follow the harvest from field to field and be shared by many growers.

Hydrocooling and vacuum cooling are the fastest cooling methods. Cooling times of half an hour are possible. Products and packaging must be able to withstand direct water contact in hydrocooling. In vacuum cooling, the products should have a large surface area, low density, and high moisture content. The boxes and wrapping must allow ventilation of heat.

Forced-air cooling can take 1 or 2 hours, depending on the amount of packaging, while room cooling may take 24 to 72 hours. Packaging must allow ventilation of heat for these methods to be successful. Package-icing provides effective cooling and a high relative humidity for products and packaging that can withstand direct contact with ice.

Many tropical fruits, vegetables, plants, and cut flowers require much less cooling than products that are cooled to 0° C (32° F). All products should be pre-cooled as near as possible to the recommended storage temperature and relative humidity. Product temperatures should be taken in sample boxes by inserting an electronic thermometer into the product. The data should be recorded for future reference.

Tables 3-8 at the end of this section provide lists of products and their recommended temperatures, relative humidities, and approximate transit and storage lives.

## **Precautionary Measures**

Products listed in tables 9 and 10 at the end of this section are sensitive to chilling or freezing injury. Care must be taken not to precool or store the products below the recommended temperature. Often the visible effects of chilling injury are delayed until the product is offered for retail sale. These effects include failure to ripen properly, pitting, decay, watery breakdown, and discoloration in fruits and vegetables. Flowers and plants lose florets or foliage, fail to open, discolor, or wilt.

All products are sensitive to decay. Precooling equipment and water should be sanitized continuously with a hypochlorite solution to eliminate decay-producing organisms. Care also must be taken not to allow products to become warm after precooling. Condensation on cool product surfaces at higher air temperatures also spreads decay.

Harvesting and packaging of most products should be closely coordinated with transportation to minimize time in transit and storage and maximize product freshness in the hands of consumers. After precooling, the products must be properly loaded and transported at or near the recommended storage temperature and relative humidity to maintain quality.

## **Transportation**

The design and condition of the transport equipment, and the loading method used, are critical to maintaining product quality. The mode of transportation and the carrier should be chosen carefully.

## **Selection Factors**

The mode of transportation and type of equipment used should be based on:

- Destination;
- Value of the product;
- Degree of product perishability;
- Amount of product to be transported;
- Recommended storage temperature and relative humidity;
- Outside temperature conditions at origin and destination points;
- Time in transit to reach destination by air, land, or ocean transport;
- Freight rates negotiated with the carriers; and
- Quality of transportation service.

The reliability and quality of transportation services provided by different carriers must be carefully considered along with the rates charged. Services and schedules are subject to change. Shippers should contact air and ocean port authorities at their origin and destination locations to receive the most current information on available services. Local trade publications also are excellent sources of information, as many carriers and their agents advertise their schedules and destinations.

Refrigerated trailers and containers are recommended for products shipped in large volumes with transit and storage lives of 1 week or more. After transit, there must be enough remaining product life for marketing. Carriers using trailers and containers may offer door-to-door service, which reduces handling, exposure, damage, and theft of the products.

Air cargo containers also can be used to provide door-to-door service. Products transported by air are generally high in value, highly perishable, but shipped in lower volumes. Freight costs are higher by air, but transit time is reduced considerably.

Many products are shipped in unrefrigerated air containers or on air cargo pallets. This requires close coordination at the origin and destination airports to protect the products when flights are delayed. Cold storage facilities are needed at airports to ensure product quality. Refrigerated air containers, insulated blankets, or gel pack refrigerants should be used when possible.

Products that can be shipped in refrigerated trailers and van containers are sometimes shipped by air to take advantage of brief market opportunities, such as the beginning of a season when prices are high and supply is limited. Often an importer who is first to receive a certain product is able to build goodwill and increase sales throughout the season.

## **Available Equipment**

The following transportation equipment is available:

- **Air Cargo Containers**—For air and highway transport.
- **Air Cargo Pallets With Netting**—For air and highway transport.
- **Highway Trailers**—For highway transport only.
- **Piggyback Trailers**—For rail, highway, and roll-on/roll-off ocean transport.

- **Containers**—For rail, highway, and lift-on/lift-off ocean transport.
- **Breakbulk Reefer Vessels**—Handling palletized loads in refrigerated holds.
- **Bulk Vessels**—Handling dry and liquid products in holds.
- **Railroad Boxcars**—Handling palletized or individual shipping containers.

### **Refrigeration and Ventilation Systems**

The following systems are available:

- **Mechanical**—Diesel-generated electric power is used over the road and aboard ocean vessels. Van containers are plugged into electrical power at depots and aboard ships.
- **Cryogenic**—Liquid or gaseous nitrogen or carbon dioxide, which is released into cargoes of frozen food and occasionally chilled food under controlled conditions. Some products, such as leafy green vegetables, are not compatible with carbon dioxide refrigeration.
- **Dry Ice**—Solid blocks of carbon dioxide in special trays or compartments are used in air cargo containers, pallet containers, and within individual shipping containers of frozen product. Shippers must check with airlines prior to using dry ice, as it is considered a hazardous material. If permitted, the containers and accompanying documents must be properly marked to show the amount of dry ice used. Some products, such as leafy green vegetables, are not compatible with dry ice. Direct contact with dry ice will injure fresh products.
- **Wet Ice**—Ice is used within individual shipping containers or on top of a load of containers, either as a supplement or instead of mechanical refrigeration. Many airlines refuse to handle shipping containers with wet ice due to the risk of expensive damage from leaking containers. Airlines that do permit wet ice require that it be placed in sealed polyethylene bags inside a leakproof container with a moisture absorbent pad.

Top-ice is used for certain fresh products to supplement mechanical refrigeration and help maintain high humidity. Most refrigeration units on trailers and containers cannot control relative humidity and actually remove moisture from products as a natural part of the cooling process.

Top-ice on loads should be applied in rows instead of a solid mass, especially in bottom air delivery equipment. Air circulation should not be blocked. The thermostat on top-iced loads should be set at 2° C (35° F) to prevent freezing of the ice into a solid mass which would block air circulation. Table 11 at the end of this section provides a list of products that benefit from top-icing. Products that can be top-iced also can be package-iced, provided the correct packaging materials are used.

- **Gel Refrigerant**—Frozen containers of chemical eutectic gel are used to maintain temperature within shipping containers. This is the refrigeration system preferred by most airlines.
- **Ventilation, Ethylene Scrubbing, Humidity Control**—Fresh air exchange in the refrigeration system or vents in dry or insulated containers can be used to protect products from a buildup of heat, moisture, carbon dioxide, or ethylene. Leafy green vegetables are sensitive to carbon dioxide, while many products are sensitive to ethylene.

In lieu of ventilation, potassium permanganate pads can be installed in the trailer or container at the refrigeration unit to absorb ethylene. These ethylene scrubbers also can be placed inside individual shipping containers.

Moisture absorbents and kraft paper liners are used to control condensation on products during transportation through different climates. Some refrigeration units are capable of maintaining humidity at optimum levels.

- **Multitemperature**—A mechanical or cryogenic system provides two or three temperature conditions in separate compartments of a trailer or container that can be used to carry loads of frozen, chilled, and dry products in one vehicle. Advance planning is required when loading multitemperature trailers. The conditions provided by three compartment trailers may include -18° C (0° F), 0° C (32° F), 10° C (50° F), or ambient temperature for products not requiring refrigeration.

The frozen compartment is usually located at the front of the trailer closest to the refrigeration unit. Movable bulkheads are placed between the compartments. Separate evaporators or ventilation between compartments provide temperature control for the nonfrozen products. Side doors are needed

to access the forward compartments when the trailers are inspected at ports of entry or used to make multiple deliveries on a single run.

- **Modified or Controlled Atmosphere**—Nitrogen and some carbon dioxide gas is added to pallet bags, or to the cargo compartment of refrigerated van containers, displacing oxygen. This reduces product decay, respiration, and ripening of certain products. Controlled-atmosphere systems monitor and replenish the nitrogen, scrub carbon dioxide, and adjust the level of oxygen according to specific product requirements. This allows products to be shipped at a higher level of maturity. Controlled atmosphere also allows for longer transit times enabling shippers to use less costly land and sea transport instead of air transport for highly perishable products and to allow the transport of riper fruit. Products shown to benefit include apples, asparagus, avocados, bananas, cherries, kiwifruit, mangoes, pears, and strawberries.

Modified or controlled atmospheres of reduced oxygen, and elevated nitrogen and carbon dioxide, are provided to specially equipped containers of certain fruits, vegetables, meat, and seafood after loading is completed. The atmospheres are tailored for each commodity. Three controlled atmosphere systems are available: gas injection, membrane air separation, and pressure swing absorption. Ethylene scrubbers can be added to these systems.

For modified and controlled-atmosphere gas injection systems, containers are equipped with channels at the doorway. A plastic curtain is sealed in the channels to reduce air leakage. Gas ports in the side of the container are used for the injection of the desired atmosphere and discharge of the existing air. In the case of controlled atmosphere, an electronic controller, a scrubber for absorbing excess carbon dioxide, and an air exchange port to allow in more oxygen are provided.

Trailers are generally considered too leaky, and transit times too short to benefit from modified or controlled atmospheres. Instead, shippers may use a gas injection system of modified atmosphere, which is applied either to pallet loads enclosed by a plastic bag or applied to individual modified-atmosphere shipping containers. The pallet application is primarily used for strawberries. The packaging application has been used for tomatoes and broccoli.

The above systems are proprietary and, applied under a service agreement, available at select ports and shipping points around the world. In the case of container loads, the service applicators must check the container for excessive air leakage prior to the application and correct major problems.

The membrane air separation system is either built into the refrigeration unit or clipped on to it. The pressure swing absorption system is installed separately in the container in addition to the refrigeration unit. These systems generate nitrogen, reduce oxygen, and add or remove carbon dioxide as needed. These systems can be programmed by the shipper and are able to overcome some air leakage. Membrane air separation is also available to service individual holds in refrigerated vessels or a number of porthole containers in the hold of a vessel.

Research continues to be conducted on using controlled atmosphere systems to reduce or eliminate insect infestations. Warning labels must be applied to containers and vessel holds with controlled atmospheres to caution employees that the atmosphere will not support human life. The cargo area must be ventilated properly before personnel can enter to unload the cargo.

### **Equipment Features**

Long-distance transportation through tropical and frigid climates requires rugged, well-designed equipment to withstand the transit environment and protect the products. Desirable features in refrigerated trailers and containers include:

- Adequate refrigeration capacity to hold frozen food at extreme ambient temperatures;
- Adequate air circulation for uniform product temperature and high relative humidity throughout the load;
- A solid return air bulkhead at the front of the trailer to ensure air circulation throughout the load;
- Vertical ribs on side walls and the rear door to assist in air circulation;
- Adequate insulation and provisions for heating in areas with extreme cold weather;
- Deep floor grooves or channels to provide an adequate cross-sectional area for air circulation under loads placed directly on the floor;
- Supply-air temperature sensing of the operation of the refrigeration unit to reduce product chilling and freezing injury;

- Provisions for ventilation to prevent ethylene or carbon dioxide buildup;
- Provisions for application of controlled or modified atmospheres; and
- Adequate suspension to reduce the amount of shock and vibration transferred to the shipping containers and the products inside.

The capacities and dimensions of air cargo containers, air cargo pallets, refrigerated trailers, and refrigerated van containers vary among carriers due to differences in equipment design and manufacture. Sample specifications are provided at the end of this section.

Carriers should be consulted for specifications, availability, and rates well in advance of shipping. Many carriers provide valuable assistance and information on loading and operating their equipment.

Room for air circulation must be provided in transport equipment loaded with agricultural products. The nature of the product, packaging type, and loading method affect air circulation, as well as the total weight and volume occupied by the load.

Maximum cargo weights are limited by carriers to comply with restrictions on particular transport and handling equipment, or limits enforced by Government agencies to protect roads and bridges. Due to light product density or load limits, many loads do not use the maximum rated-weight capacity of the transport equipment.

Most carriers check their transport equipment before delivery to the shipper for loading. Good equipment condition is critical to maintaining product quality. The shipper also should check the equipment to ensure it is in good working order and meets the needs of the product. Carriers provide guidance on checking and operating the refrigeration systems.

All transportation equipment should be checked for:

- **Cleanliness**—The load compartment should be regularly steam cleaned.
- **Damage**—Walls, floors, doors, and ceilings should be in good condition.
- **Temperature Control**—Refrigerated units should have been calibrated recently and capable of supplying continuous air circulation for uniform product temperatures.

Shippers should insist on clean equipment. A load of products can be ruined by:

- Odors from previous shipments;
- Toxic chemical residues;
- Insects nesting in the equipment;
- Decaying remains of agricultural products; and
- Debris blocking drain openings or air circulation along the floor.

Shippers should insist on well-maintained equipment and check for the following:

- Damage to walls, ceilings, or floors, which can let in the outside heat, cold, moisture, dirt, and insects;
- Operation and condition of doors, ventilation openings, and seals; and
- Provisions for load locking and bracing.

For refrigerated trailers and containers, the following additional checks are important:

- With the doors closed, the cargo area should be checked from inside for light-door gaskets must seal. A smoke generator also can be used to detect leaks.
- The refrigeration unit should cycle from high to low speed when the desired temperature is reached and then back to high speed.
- The location of the sensing element that controls the discharge air temperature must be located. If it measures return air temperature, the thermostat will have to be set higher to avoid a chilling injury or freezing injury to the products.
- A solid return air bulkhead should be installed at the front of the trailer.
- A heating device should be available for transportation in areas with extreme cold weather.
- Equipment with a top air delivery system must have a fabric air chute or metal ceiling plenum in good condition.

Products requiring refrigeration should be thoroughly precooled prior to loading into transportation equipment. Product temperatures should be taken with an electronic probe thermometer and recorded on the bill of lading for future reference.

The load compartment in the equipment also should be precooled to the recommended transport or storage temperature for the product. Ideally, the loading area should be enclosed and refrigerated, with dock seals at the trailer or container doors.

Proper loading practices are critical to maintaining temperature and relative humidity, protecting the products from impact and vibration forces in transit, and preventing insects from entering the load. Special care must be taken when shipping mixed loads—the products must be compatible.

### **Loading Methods**

Basic loading methods include:

- Bulkloading, by machine or hand, of unpackaged commodities;
- Hand loading individual boxes with or without pallets; and
- Unit loading of palletized or slipsheet loads of boxes with pallet jacks or forklifts.

### **Mixed Loads**

Many products are often transported in mixed loads or stored with other products. They must be compatible in terms of:

- Recommended temperature and relative humidity;
- Production and sensitivity to ethylene; and
- Production and absorption of odors.

Groups of fresh products suitable for transportation and storage together have been identified and are listed in table 15 at the end of this section. Products sensitive to chilling, freezing, moisture loss, ethylene, and odors are listed in tables 9-14.

Many products are subject to chilling injury when transported or stored at lower than recommended temperatures (table 9, table 10). This damage often becomes apparent after the products warm up. Products injured may show pitting, discoloration, water-soaked areas, decay, and failure to ripen.

Many products are recommended to be transported or stored at temperatures only 1° C to 3° C (2° F to 6° F) above their freezing points. Thermostats on some trailers and van containers are set 1° C to 3° C (2° F to 6° F) higher than the recommended temperature of 0° C (32° F) for chilled products. Most tropical products that freeze are first damaged by chilling injury.

Most products need to be transported and stored at a high relative humidity. Some products are more susceptible to moisture loss than others (table 11, table 12). Moisture loss results in wilting and shriveling. To

reduce moisture loss, products must be adequately precooled before transit. Some products also are waxed, film-wrapped, package-iced, or top-iced. Relative humidity during transit and storage must be maintained as much as possible.

Never transport or store fruits and vegetables that produce a lot of ethylene with products that are sensitive to it (table 13). Ethylene can cause premature ripening of some products and will ruin others, such as plants and cut flowers. Cucumbers and celery turn yellow, while lettuce will turn brown, in the presence of ethylene. Potassium permanganate pads can be used to absorb ethylene during transit and storage.

Never transport or store odorous products with products that will absorb the odors (table 14). Never load fruit, vegetables, or other food products with nonfood products that provide any risk of contamination through transfer of toxic chemical residues.

Similar-sized shipping containers should be loaded together in mixed loads for increased stability. Heavier shipping containers of products should be loaded first and distributed evenly across the floor of the trailer or container. Lighter shipping containers can then be placed against or on top of the heavier products.

Load lock bars, load gates, and pallets placed in a vertical position can be used to separate and secure stacks of different-sized shipping containers. To facilitate inspection of mixed loads at ports of entry, a representative sample of each commodity should be available near the door. This can minimize the unloading of cargo for examination.

The longer the transit time, the higher the risks in transporting mixed loads of agricultural products. Therefore, it is essential that guidelines be followed closely to maintain quality in distant markets.

### **Providing for Air Circulation**

Inadequate provisions for air circulation will ruin a load, even in well-designed transportation equipment. When possible, boxes should be kept off shallow floors and away from flat sidewalls by using pallets, racks, and dunnage. Room for air circulation must be provided under, around, and through the load to protect the products from:

- Heat gain from the outside air during hot weather;
- Heat generated by the produce through respiration;

- Ethylene produced by certain products;
- Heat loss to the outside air during extreme cold weather; and
- Chilling injury or freezing injury during operation of the refrigeration unit.

### ***Temperature Monitoring and Recording***

Shippers should follow the carrier's recommendations on loading and setting the temperature of the equipment's load compartment to avoid chilling or freezing injury to fresh products. Discharge air may be colder than the set-point temperature if the refrigeration system operates on return-air temperature sensing. The temperature should be clearly marked on the bill of lading. Drivers and shipper should check product temperatures with a pulp thermometer and record the temperatures during the loading process.

Many carriers advise setting the thermostat temperature 1° C to 3° C (2° F to 6° F) higher than the recommended temperature of 0° C (32° F) for chilled products. This depends on the design of the transportation equipment. Newer equipment with supply-air temperature sensing and good air circulation can be operated closer to the recommended temperature.

For most tropical fruits and vegetables and plants that have recommended temperatures in the 10° C to 21° C (50° F to 70° F) range, the thermostat is set at or near the recommended temperature.

It is now possible to monitor refrigeration unit operating conditions from a central control room on a ship or by satellite transmission.

Refrigeration units for trailers and containers may have an electronic recorder which can monitor up to three different points in the load. These data can be downloaded and analyzed on a computer. Mechanical temperature recorders that place data on a circular chart also are used.

In addition to trip insurance, all loads should have a small portable air-temperature recorder (supplied by the shipper) placed between packages in the area where the warmest temperatures occur. Recorder companies recommend placement on top of the load, near a sidewall, one-third of the way in from the rear doors, and away from any direct discharge of refrigerated air.

Railcars should have two or three portable recorders. In loads with top-ice or humidity above 95 percent, the recorders should be waterproof or enclosed in a plastic bag. Models are available for frozen food applications.

Shippers and receivers must follow the recorder company's instructions on documenting the load, starting the recorder, reading the results, and returning it for calibration and certification. The temperature recorder chart and/or instrument number should be clearly marked on the bill of lading. These steps are essential for settling claims over temperature management during transportation.

In the European Union temperature recording is mandatory. It also is necessary in the case of cold treatment quarantine shipments in which fruit is held at specific temperatures to kill fruit flies.

### ***Cold Treatment and Pest Control***

Shippers should avoid loading at night. Insects attracted by light can enter the load and cause problems upon inspection at destination. The loading area should be enclosed to prevent insects from reinfesting treated and packaged products. The Animal and Plant Health Inspection Service (APHIS) operates a pre-clearance program in which product is inspected and certified to be free of injurious insect pests and plant diseases. Such shipments are marked and sealed to prevent tampering and infestation.

Fumigations for pest control inside loaded transportation equipment are usually done under APHIS supervision in accordance with the necessary treatment schedule for a particular product and insect. Cold treatment of certain products during transportation also is used to kill insects. This involves strict temperature control throughout the load for up to 2 weeks. APHIS maintains a list of refrigerated vessels and refrigerated containers certified as capable of maintaining intransit cold treatment temperatures.

### ***Bracing the Load***

Loads should be secured with some of the following materials to prevent vibration and impact damage in transit:

- Aluminum or wood load locks;
- Fiberboard honeycomb fillers;
- Wood blocking and nailing strips;

- Inflatable kraft paper air bags;
- Cargo nets and straps; and
- Wood load gates constructed of 25 by 102 mm (1 by 4 in) material.

### ***Loading Air Cargo Equipment***

Air cargo containers are loaded by hand or with forklifts when using fiberboard LD-3 container inserts. Polystyrene foam triangular inserts, wood blocking, and fiberboard dunnage are recommended to brace boxes and provide a level platform on the sloped surface of LD-3 containers. Refrigerated air cargo containers should be used when available.

Air cargo pallets are loaded by hand or with forklifts. The loads should be secured with straps, tape, or cross-stacking of the boxes. A weatherproof or insulated cover can be placed over the load along with the required cargo netting, provided the pallet load is protected from sunlight.

### ***Loading Trailers and Containers***

For refrigerated trailers and containers the following loading practices are recommended:

- Precool the trailer or container to the recommended transport or storage temperature. Turn off the refrigeration unit during loading if the loading area is not refrigerated; otherwise, the evaporator will frost due to the warm air drawn in by the unit.
- Thoroughly precool unit loads, as air circulation to some of the shipping containers may be limited. The containers should have openings for cooling and ventilation of product heat.
- Avoid loading tightly against flat sidewalls. Use centerline loading for unit loads.
- Secure unitized loads with dunnage between the walls and load.
- Do not block air circulation at the rear door.
- Secure the rear of both hand-stacked and unitized loads with straps, load gates, or load lock bars to prevent the load from shifting against the rear doors. Figures 1-5 at the end of this section illustrate unit loading and hand loading patterns.

### ***Trailers and Containers With Top Air Delivery***

For refrigerated trailers and containers with air delivered to the top of the load by chutes or ceiling ducts, these additional practices are necessary to maintain product quality:

- Hand-stacked loads should be evenly spaced, with lengthwise air flow channels created on every other layer, to ventilate product heat (respiration).
- Header stacks must be provided at the front bulkhead of the trailer or container in hand-stacked loads to connect all the lengthwise channels and allow the air to return to the evaporator.
- Loads of frozen food or nonrespiring products can be loaded solidly without air channels in the middle of the load.
- Fiberboard boxes must be strong enough to counter the reduced stacking strength due to the boxes being offset to provide airflow channels.
- Pallets should be used with hand-stacked loads to provide adequate air circulation in equipment with flat or shallow grooved floors.
- The load should not block the ceiling air chute or plenum.

### ***Trailers and Containers With Bottom Air Delivery***

For refrigerated trailers and containers with air delivered to the bottom of the load through the floor channels, these additional practices are necessary to maintain product quality:

- Hand-stacked and unit loads of boxes should have bottom-to-top ventilation slots that align in the stacks. Otherwise, small vertical air flow channels are needed between boxes as a result of the slight bulge in the box sides.
- At least 13 mm (5 in) of space should be provided at the ceiling for return-air circulation.
- The load should cover most of the floor surface to force more air through the load. Pieces of fiberboard can be used to cover any remaining floor space next to unit loads or stacks of boxes. Only the floor area next to the doorway should be open to permit return air flow.

### ***Intransit Procedures***

During transportation of refrigerated loads in trailers and containers, the carrier should check the operation of the refrigeration unit and temperature of the load compartment regularly.

### ***Receiving Procedures***

Before completely unloading a shipment for storage, receivers usually check the load to determine if it meets specifications for quality, grade, and packaging. The receiver also will note whether the load was ade-



quately braced and the correct temperature maintained.

Product temperatures in sample shipping containers throughout the load should be taken and recorded, using an electronic probe thermometer. The air-temperature recorder should be read, if one was placed in the load. Shippers and carriers should be notified of any problems with the product, packaging, loading method, or transportation equipment, so corrective action can be taken.

If there is a problem with the load, the receiver, carrier, or shipper can request an inspection by a licensed inspector. Unresolved disputes over product quality or payment can be referred to arbitration or other legal avenues.

Unloaded products need to be protected from direct sun, condensation, ethylene, and contamination. Products needing refrigeration or protection from hot or cold temperatures should be placed in the recommended storage conditions as soon as possible. Otherwise, the efforts of growers, shippers, and carriers to maintain product quality will have been in vain.

### **Air Circulation and Sanitation in Storage**

Uniform air circulation in the storage room at the proper temperature and relative humidity is important to remove product heat that occurs from respiration, and from outside heat that enters through door openings and building surfaces. Doors to refrigerated storage areas should be protected with plastic strip curtains to reduce heat gain during operations. Warm air will quickly reduce relative humidity in the cold storage area.

To maintain temperature and relative humidity, the storage room refrigeration system should have a large evaporator surface area, an adequate number of fans, and a humidifier. Temperature control should be by an electronic thermostat. The system must be carefully balanced to avoid free moisture or excessive air flow.

Electric forklifts and pallet jacks should be used with horticultural products to reduce ethylene. Periodic sanitation of the storage room walls, ceilings, floor, and refrigeration units is necessary to reduce decay organisms and odors. Carbon filters can be used to absorb odors and volatile gases, while potassium permanganate pads and air exchange can reduce ethylene.

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**Table 3: Recommended Temperature and Relative Humidity, and Approximate Transit and Storage Life for Fruits and Vegetables**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Amaranth	0 to 2	32 to 36	95 to 100	10 to 14 days
Anise	0 to 2	32 to 36	90 to 95	2 to 3 wk
Apples, hardy varieties	-1 to 0	30 to 32	90 to 95	2 to 7 mo
Apples, chill sens. var.	3 to 4	38 to 40	90 to 95	2 to 7 mo
Apricots	-0.5 to 0	31 to 32	90 to 95	1 to 2 wk
Artichokes, globe	-0.5 to 0	31 to 32	95 to 100	2 to 3 wk
Asian pear	1	34	90 to 95	5 to 6 mo
Asparagus	0 to 2	32 to 36	95 to 98	2 to 3 wk
Atemoya	13	55	85 to 90	4 to 6 wk
Avocados, Fuerte, Hass	7	45	85 to 90	2 to 3 wk
Avocados, Lula, Booth-1	4	40	85 to 90	4 to 8 wk
Avocados, Fuchs, Pollock, Waldin	13	55	85 to 90	2 wk
Babaco	7	45	85 to 90	1 to 3 wk
Bananas, green	13 to 14	56 to 58	90 to 95	1 to 4 wk
Barbados cherry	0	32	85 to 90	7 to 8 wk
Bean sprouts	0	32	95 to 100	1 wk
Beans, dry	4 to 10	40 to 50	40 to 50	6 to 10 mo
Beans, green or snap	4 to 7	40 to 45	95 to 98	7 to 10 days
Beans, lima, in pods	5 to 6	41 to 43	95	5 days
Beets, bunched	0	32	98 to 100	10 to 14 days
Beets, topped	0	32	98 to 100	4 to 6 mo
Belgian endive	2 to 3	36 to 38	95 to 100	2 to 4 wk
Bitter melon	12 to 13	53 to 55	86 to 90	2 to 3 wk
Black sapote	13 to 15	55 to 60	85 to 90	2 to 3 wk
Blackberries	-0.5 to 0	31 to 32	90 to 95	2 to 5 days
Blood orange	4 to 7	40 to 44	90 to 95	3 to 8 wk
Blueberries	-0.5 to 0	31 to 32	90 to 95	12 to 15 days, first harvest
Bok choy	0	32	95 to 100	3 wk
Boniato	13 to 15	55 to 60	85 to 90	4 to 5 mo
Breadfruit	13 to 15	55 to 60	85 to 90	2 to 6 wk
Broccoli	0	32	95 to 98	10 to 14 days, 4 to 6 wk under controlled atmosphere (CA)
Brussels sprouts	0	32	95 to 98	3 to 5 wk

**Table 3: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Cabbage, early	0	32	98 to 100	3 to 6 wk
Cabbage, late	0	32	98 to 100	5 to 6 mo, 7 to 9 mo under CA
Cactus leaves	2 to 4	36 to 40	90 to 95	3 wk
Cactus pear	2 to 4	36 to 40	90 to 95	3 wk
Caimito	3	38	90	3 wk
Calabaza	10 to 13	50 to 55	50 to 70	2 to 3 mo
Calamondin	9 to 10	48 to 50	90	2 wk
Canistel	13 to 15	55 to 60	85 to 90	3 wk
Cantaloupes	2 to 4	35 to 40	90 to 95	1 to 2 wk
Calamondin	9 to 10	48 to 50	85 to 90	2 wk
Carambola	5 to 10	41 to 50	85 to 90	4 to 7 wk
Carrots, bunched	0	32	95 to 100	10 to 14 days
Carrots, mature topped	0	32	98 to 100	7 to 9 mo
Carrots, immature topped	0	32	98 to 100	4 to 6 wk
Cashew apple	0 to 2	32 to 36	85 to 90	5 wk
Cauliflower	0	32	95 to 98	2 to 4 wk
Celeriac	0	32	95 to 99	6 to 8 mo
Celery	0	32	98 to 100	1 to 3 mo
Chard, Swiss	0	32	95 to 100	1 to 2 wk
Chayote squash	7	45	85 to 90	1 to 2 wk
Cherimoya	8 to 9	46 to 48	85 to 90	1 to 2 wk
Cherries, sour	0	32	90 to 95	3 to 7 days
Cherries, sweet	-1 to -0.5	30 to 31	90 to 95	2 to 3 wk
Chinese broccoli	0	32	95 to 100	10 to 14 days
Chinese cabbage	0	32	95 to 100	2 to 3 mo
Chinese Dates	10	50	85 to 90	10 wk
Chinese long bean	4 to 7	40 to 45	90 to 95	7 to 10 days
Chives	0	32	90 to 95	2 wk
Citron (Citrus Medica)	13	55	85 to 90	6 to 8 wk
Clementine	4	40	90 to 95	2 to 4 wk
Coconuts	0 to 1.5	32 to 35	80 to 85	1 to 2 mo
Collards	0	32	95 to 100	10 to 14 days
Corn, sweet	0	32	95 to 98	4 to 8 days
Cranberries	3.3 to 4	38 to 40	80 to 85	2 to 4 mo

**Table 3: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Cucumbers	10 to 13	50 to 55	90 to 95	10 to 14 days
Currants	-0.5 to 0	31 to 32	90 to 95	1 to 4 wk
Custard apples	5 to 7	41 to 45	85 to 90	4 to 6 wk
Diakon	0 to 1	32 to 34	95 to 100	4 mo
Dates, soft, semi-soft	0	32	75	6 mo, soft 12 mo, semi-soft
Dewberries	-0.5 to 0	31 to 32	90 to 95	2 to 3 days
Durian	4 to 6	39 to 42	85 to 90	6 to 8 wk
Eggplants	8 to 12	46 to 54	90 to 95	1 to 2 wk
Elderberries	-0.5 to 0	31 to 32	90 to 95	1 to 2 wk
Endive and escarole	0	32	95 to 98	2 to 3 wk
Feijoa	5 to 10	41 to 50	90	2 to 3 wk
Figs, fresh	0	32	85 to 90	7 days
Figs, dried	0 to 10	32 to 50	50 to 70	1 year
Garlic	0	32	60 to 70, ventilation	6 to 7 mo, if properly cured
Ginger root	13	55	65 to 75	4 to 6 mo
Gooseberries	-0.5 to 0	31 to 32	90 to 95	3 to 4 wk
Granadilla	10	50	85 to 90	3 to 4 wk
Grapefruit, CA & AZ	14 to 15	58 to 60	85 to 90	6 to 8 wk
Grapefruit, FL & TX	10 to 15	50 to 60	85 to 90	6 to 10 wk
Grapes, Vinifera	-1 to -0.5	30 to 31	90 to 95	2 to 6 mo
Grapes, American	-0.5 to 0	31 to 32	85 to 90	3 to 8 wk
Greens, leafy	0	32	95 to 100	10 to 14 days
Guava	7 to 10	45 to 50	90	2 to 3 wk
Haricot vert	4 to 7	40 to 45	95	7 to 10 days
Horseradish	-1 to 0	30 to 32	98 to 100	10 to 12 mo
Jaboticaba	13 to 15	55 to 60	90 to 95	2 to 3 days
Jackfruit	13	55	85 to 90	2 to 6 wk
Jaffa orange	8 to 10	46 to 50	85 to 90	8 to 12 wk
Japanese eggplant	8 to 12	46 to 54	90 to 95	1 wk
Jerusalem Artichoke	-0.5 to 0	31 to 32	90 to 95	4 to 5 mo
Jicama	13 to 18	55 to 65	65 to 70	1 to 2 mo
Kale	0	32	95	3 wk
Kiwano	10 to 15	50 to 60	90	6 mo

**Table 3: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Kiwifruit	0 to 0.6	32 to 33	90 to 95	3 to 4 mo
Kohlrabi, without leaves	0	32	98 to 100	2 to 3 mo
Kumquats	4 to 5	39 to 41	90 to 95	2 to 4 wk
Langsat	11 to 14	52 to 58	85 to 90	2 wk
Leeks	0	32	95 or above	3 mo
Lemons	7 to 10	45 to 50	85 to 95	2 to 3 mo
Lettuce, Iceberg	0 to 1	32 to 34	95 to 100	2 to 3 wk
Limes	9 to 10	48 to 50	85 to 90	6 to 8 wk
Lo bok	0 to 1.5	32 to 35	95 to 100	2 to 4 mo
Loganberries	-0.5 to 0	31 to 32	90 to 95	2 to 3 days
Longan	1.5	35	90 to 95	3 to 5 wk
Loquats	0	32	90	2 to 3 wk
Lychees	0 to 2	32 to 36	90 to 95	3 to 5 wk
Malanga	7	45	70 to 80	3 mo
Mamey	13 to 15	55 to 60	90 to 95	2 to 6 wk
Mangoes	13	55	85 to 90	2 to 3 wk
Mangosteen	13	55	85 to 90	2 to 4 wk
Melons:				
Casaba	7 to 10	45 to 50	90 to 95	4 to 6 wk
Crenshaw	7 to 10	45 to 50	90 to 95	2 wk
Honeydew	7 to 10	45 to 50	90 to 95	2 to 3 wk
Persian	7 to 10	45 to 50	90 to 95	2 wk
Mushrooms	0 to 1.1	32 to 34	90 to 95	3 to 5 days
Nectarines	-0.5 to 0	31 to 32	90 to 95	2 to 4 wk
Okra	7 to 10	45 to 50	90 to 95	7 to 10 days
Olives, fresh	7	45	85 to 90	2 to 4 wk
Onions, green	0	32	95 to 100	4 wk
Onions, Bermuda	0	32	65 to 70	1 to 2 mo
Onions, Globe	0	32	65 to 70	6 to 8 mo
Onions, Spanish	0	32	65 to 70	3 to 6 mo
Onions, dehydrated	10	50	65 to 70	3 to 6 mo
Onions, dehydrated	2	36	65 to 70	12 mo
Onion sets	0	32	65 to 70	6 to 8 mo
Oranges, CA	5 to 7	41 to 45	85 to 90	2 to 6 wk

**Table 3: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Oranges, AZ, March	9	48	85 to 90	6 to 8 wk
Oranges AZ, June	3	37	85 to 90	6 to 8 wk
Oranges, FL & TX	0 to 1	32 to 34	85 to 90	8 to 12 wk
Oranges, Jaffa	8 to 10	46 to 50	85 to 90	8 to 12 wk
Oranges, Mandarin	3 to 4	38 to 40	85 to 90	3 to 4 wk
Papayas, partially ripe	10 to 13	50 to 55	85 to 90	1 to 3 wk
Papayas, fully ripe	4 to 10	40 to 50	85 to 90	2 to 3 days
Passion Fruit	7 to 10	45 to 50	85 to 90	3 to 4 wk
Parsley	0	32	95	2 to 3 wk
Parsnips	0	32	98 to 100	4 to 6 mo
Peaches	-0.6 to 0	31 to 32	90 to 95	2 to 4 wk
Pears, Anjou	-1.5 to -0.6	29 to 31	90 to 95	6 to 7 mo
Pears, Bartlett	-1.5 to -0.6	29 to 31	90 to 95	2 to 3 mo
Pears, Bosc	-1.5 to -0.6	29 to 31	90 to 95	3 to 4 mo
Pears, Comice	-1.5 to -0.6	29 to 31	90 to 95	4 to 5 mo
Pears, Hardy	-1.5 to -0.6	29 to 31	90 to 95	2 to 3 mo
Pears, Kieffer	-1.5 to -0.6	29 to 31	90 to 95	2 to 3 mo
Pears, Packham Triumph	-1.5 to -0.6	29 to 31	90 to 95	5 to 6 mo
Pears, Seckel	-1.5 to -0.6	29 to 31	90 to 95	3 to 3.5 mo
Pears, Winter Nelis	-1.5 to -0.6	29 to 31	90 to 95	7 to 8 mo
Peas, green	0	32	95	1 wk
Peas, southern	4 to 5	40 to 41	95	1 wk
Pepino	7.5 to 10	45 to 50	85 to 90	1 mo
Peppers, Chili (dry)	0 to 10	32 to 50	60 to 70	6 mo
Peppers, sweet	7 to 10	45 to 50	90 to 95	2 wk
Persimmons, Japanese	0 to 2	32 to 36	90 to 95	2 to 4 mo
Pineapples	7 to 10	45 to 50	85 to 90	2 to 3 wk
Plantain	13 to 14	55 to 58	90 to 95	1 to 5 wk
Plums, Angelino	-0.6 to 0	31 to 32	90 to 95	3 to 5 wk
Plums, Black Amber	-0.6 to 0	31 to 32	90 to 95	3 to 5 wk
Plums, Casselman	-0.6 to 0	31 to 32	90 to 95	5 to 6 wk
Plums, El Dorado	-0.6 to 0	31 to 32	90 to 95	3 to 5 wk
Plums, Friar	-0.6 to 0	31 to 32	90 to 95	3 to 4 wk
Plums, Kelsey	-0.6 to 0	31 to 32	90 to 95	2 wk



**Table 3: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Plums, Laroda	-0.6 to 0	31 to 32	90 to 95	3 to 4 wk
Plums, Late Santa Rosa	-0.6 to 0	31 to 32	90 to 95	3 wk
Plums, Nubiana	-0.6 to 0	31 to 32	90 to 95	2 wk
Plums, President	-0.6 to 0	31 to 32	90 to 95	3 wk
Plums, Queen Ann	-0.6 to 0	31 to 32	90 to 95	3 to 4 wk
Plums, Red Beaut	-0.6 to 0	31 to 32	90 to 95	1 to 2 wk
Plums, Roysum	-0.6 to 0	31 to 32	90 to 95	3 to 4 wk
Plums, Santa Rosa	-0.6 to 0	31 to 32	90 to 95	3 to 5 wk
Plums, Simka	-0.6 to 0	31 to 32	90 to 95	3 wk
Plums, Wickson	-0.6 to 0	31 to 32	90 to 95	4 wk
Pomegranates	5	41	90 to 95	2 mo
Potatoes, curing condition	10 to 18	50 to 65	95	10 to 14 days
Potatoes, early, cured	4	40	95	3 to 5 mo
Potatoes, late, cured	4	40	95	5 to 10 mo
Potatoes, seed, cured	3	38	95	5 to 10 mo
Potato for french fry cured	10	50	95	1 to 10 mo
Potato for chipping cured	13	55	95	1 to 8 mo
Potatoes, dehydrated	7	45		3 to 6 mo
Potatoes, dehydrated	0	32		6 to 12 mo
Prunes, Italian	-0.6 to 0	31 to 32	90 to 95	2 to 3 wk
Pummelo	7 to 9	45 to 48	85 to 90	12 wk
Pumpkins	10 to 13	50 to 55	60 to 70	2 to 3 mo
Quinces	-0.5 to 0	31 to 32	90	2 to 3 mo
Raddichio	0 to 1	32 to 34	95	2 to 3 wk
Radishes, spring, topped	0	32	95+	3 to 4 wk
Radishes, winter	0	32	95+	3 to 4 mo
Rambutan	12	54	90 to 95	1 to 3 wk
Raspberries	-0.5 to 0	31 to 32	90 to 95	2 to 3 days
Rhubarb	0	32	95	2 to 4 wk
Rutabagas	0	32	95 to 100	4 to 6 mo
Salsify	0	32	95 to 98	2 to 4 mo
Santol	7 to 9	45 to 48	85 to 90	3 wk
Sapodilla	15 to 20	60 to 68	85 to 90	2 to 3 wk
Sapote, Turning	15 to 20	60 to 68	85 to 90	2 to 3 wk

**Table 3: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Sapote, Ripe	0 to 2	32 to 36	85 to 90	1 to 2 wk
Scorzonera	0 to 1	32 to 34	95 to 98	6 mo
Seedless cucumbers	10 to 13	50 to 55	85 to 90	10 to 14 days
Snow peas	0 to 1	32 to 34	90 to 95	1 to 2 wk
Soursop	13	55	85 to 90	1 to 2 wk
Spinach	0	32	95 to 100	1 to 2 wk
Squashes, summer	5 to 10	41 to 50	95	1 to 2 wk
Squashes, winter:				
Table Queen, Acorn	10 to 13	50 to 55	60 to 70	5 to 7 wk
Quality	10 to 13	50 to 55	60 to 70	11 wk
Butternut	10 to 13	50 to 55	60 to 70	3 mo
Connecticut Field	10 to 13	50 to 55	60 to 70	2 to 3 mo
Cushaw	10 to 13	50 to 55	60 to 70	2 to 3 mo
Hubbard	10 to 13	50 to 55	60 to 70	6 mo
Kabocha	10 to 13	50 to 55	60 to 70	3 mo
Turban	10 to 13	50 to 55	60 to 70	3 mo
Strawberries	-0.5 to 0	31 to 32	90 to 95	5 to 10 days
Sugar apples	7	45	85 to 90	4 wk
Sweet potatoes	13 to 16	55 to 60	85 to 90	3 to 10 mo
Tamarillos	7 to 10	45 to 50	90	1 to 2 wk
Tamarinds	7	45	90 to 95	3 to 4 wk
Tangerines	3 to 4	38 to 40	85 to 95	2 to 4 wk
Taro root (Dasheen)	7 to 10	45 to 50	85 to 90	4 to 5 mo
Tomatillos	13 to 15	55 to 60	85 to 90	3 wk
Tomatoes, mature-green	13 to 18	55 to 65	85 to 90	2 to 3 wk
Tomatoes, pink	10 to 13	50 to 55	85 to 90	7 to 10 days
Tomatoes, ripe	7 to 10	45 to 50	90 to 95	3 to 5 days
Turnips	0	32	95	4 to 5 mo
Turnip greens	0	32	95 to 100	10 to 14 days
Uniq fruit, Ugli™ tangelo	4	40	90 to 95	2 to 3 wk
Waterchestnuts	1 to 2	34 to 36	90 to 98	2 to 4 mo
Watercress	0 to 1	32 to 34	95 to 100	2 to 3 wk
Watermelons	10 to 16	50 to 60	90	2 to 3 wk
White sapote	19 to 21	67 to 70	85 to 90	2 to 3 wk

**Table 3: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
White asparagus	0 to 2	32 to 36	95 to 100	2 to 3 wk
Winged bean	10	50	90	4 wk
Yams	16	61	70 to 80	3 to 6 mo
Yucca root	0 to 2	32 to 36	85 to 90	1 to 2 mo

Source: *The Refrigeration Research and Education Foundation; The Packer; Hardenburg, Watada, and Wang; McGregor; Maersk SeaLand; APL.*

**Table 4: Suggested Shipping Temperatures for Acclimatized Foliage Plants**

Plant name	1 to 14 days <sup>1</sup> shipment		15 to 28 days <sup>1</sup> shipment	
	°C	°F	°C	°F
<i>Acoelorrhaphe wrightii</i>	10 to 13	50 to 55	—	—
<i>Aglaonema</i> 'Fransher'	13 to 15.5	55 to 60	15.5 to 18.3	60 to 65
<i>Aglaonema</i> 'Maria'	13 to 18.3	55 to 65	13 to 18.3	55 to 65
<i>Aglaonema</i> 'Silver Queen'	15.5 to 18.3	60 to 65	15.5 to 18.3	60 to 65
<i>Aphelandra squarrosa</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60 <sup>2</sup>
<i>Araucaria heterophylla</i>	10 to 18.3	50 to 65	10 to 18.3	50 to 65
<i>Ardisia crispa</i>	10 to 15.5	50 to 60	10 to 15.5	50 to 60
<i>Aspidistra elatior</i>	10 to 13	50 to 55	10 to 13	50 to 55
<i>Asplenium nidus</i>	10 to 18.3	50 to 65	10 to 18.3	50 to 65
<i>Beaucarnea recurvata</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60
<i>Brassaia actinophylla</i>	10 to 13	50 to 55	10 to 13	50 to 55
<i>Cereus peruvianus</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60
<i>Chamaedorea elegans</i>	10 to 15.5	50 to 60	10 to 15.5	50 to 60
<i>Chamaedorea seifrizii</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60
<i>Chrysalidocarpus lutescens</i>	13 to 18.3	55 to 65	15.5 to 18.3	60 to 65 <sup>3</sup>
<i>Cadiaeum variegatum</i> 'Norma'	15.5 to 18.3	60 to 65	15.5 to 18.3	60 to 65
<i>Cordyline terminalis</i> 'Baby Doll'	13 to 15.5	55 to 60	10 to 13	50 to 55 <sup>3</sup>
<i>Cordyline terminalis</i> 'Dragon Tongue'	15.5 to 18.3	60 to 65	—	—
<i>Crassula argentea</i>	10 to 18.3	50 to 65	10 to 18.3	50 to 65
<i>Dieffenbachia</i> 'Tropic Snow'	13 to 18.3	55 to 65	13 to 18.3	55 to 65 <sup>3</sup>
<i>Dizygotheca elegantissima</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60
<i>Dracaena deremensis</i> 'Janet Craig'	15.5 to 18.3	60 to 65	15.5 to 18.3	—
<i>Dracaena deremensis</i> 'Warneckii'	15.5 to 18.3	60 to 65	—	—
<i>Dracaena fragrans</i> 'Massangeana'	15.5 to 18.3	60 to 65	15.5 to 18.3	60 to 65
<i>Dracaena godseffiana</i> 'Florida Beauty'	13 to 18.3	55 to 65	13 to 15.5	55 to 60 <sup>2</sup>
<i>Dracaena marginata</i>	13 to 18.3	55 to 65	15.5 to 18.3	60 to 65 <sup>3</sup>
<i>Dracaena reflexa</i>	10 to 18.3	50 to 65	10 to 18.3	50 to 65
<i>Epipremnum aureum</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60 <sup>2</sup>
<i>Ficus benjamina</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60
<i>Ficus elastica</i> 'Burgundy'	10 to 15.5	50 to 60	10 to 13	50 to 55
<i>Ficus elastica</i> 'Robusta'	10 to 15.5	50 to 60	10 to 15.5	50 to 60
<i>Ficus lyrata</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60

**Table 4: Continued**

Plant name	1 to 14 days <sup>1</sup> shipment		15 to 28 days <sup>1</sup> shipment	
	°C	°F	°C	°F
<i>Ficus retusa</i> 'Nitida'	13 to 15.5	55 to 60	13 to 15.5	55 to 60 <sup>3</sup>
<i>Hedera helix</i> 'Eva'	13 to 15.5	50 to 60	10 to 13	50 to 55
<i>Hedera helix</i> 'Sweetheart'	10 to 13	50 to 55	10 to 13	50 to 55 <sup>3</sup>
<i>Howea forsteriana</i>	10 to 18.3	50 to 65	10 to 18.3	50 to 65
<i>Hoya carnosa</i> 'Tricolor'	13 to 18.3	55 to 65	13 to 18.3	55 to 65
<i>Maranta leuconeura</i>	10 to 13	50 to 55	10 to 13	50 to 55 <sup>2</sup>
<i>Nephrolepis exaltata</i> 'Bostoniensis'	13 to 15.5	55 to 60	13 to 15.5	55 to 60 <sup>2</sup>
<i>Philodendron scandens</i> oxycardium	13 to 15.5	55 to 60	13 to 15.5	55 to 60 <sup>2</sup>
<i>Philodendron selloum</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60
<i>Phoenix roebelenii</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60
<i>Plectranthus nummularius</i>	13 to 15.5	55 to 60	13 to 15.5	55 to 60 <sup>2</sup>
<i>Pilea</i> 'Moon Valley'	13 to 18.3	55 to 65	13 to 18.3	55 to 65
<i>Pilea</i> 'Silver Tree'	13 to 15.5	55 to 60	13 to 15.5	55 to 60 <sup>2</sup>
<i>Pittosporum tobira</i>	10 to 18.3	50 to 65	10 to 18.3	50 to 65
<i>Pittosporum tobira</i> 'Wheelerii'	10 to 18.3	50 to 65	10 to 18.3	50 to 65
<i>Podocarpus gracilior</i>	10 to 18.3	50 to 65	10 to 18.3	50 to 65
<i>Rhapis excelsa</i>	10 to 13	50 to 55	13 to 15.5	55 to 60
<i>Schefflera arboricola</i>	10 to 13	50 to 55	10 to 13	50 to 55
<i>Spathiphyllum</i> 'Mauna Loa'	10 to 13	50 to 55	13 to 18.3	55 to 60
<i>Syngonium</i> 'White Butterfly'	13 to 15.5	55 to 60	13 to 18.3	55 to 60 <sup>2</sup>
<i>Washingtonia robusta</i>	10 to 15.5	50 to 60	10 to 13	50 to 55
<i>Yucca elephantipes</i>	10 to 13	50 to 55	10 to 13	50 to 55

<sup>1</sup>Plants shipped or stored for 1 to 7 days should be held at the highest temperature listed for that plant.

<sup>2</sup>Plants observed to have severe loss in quality beyond 2 wk.

<sup>3</sup>Plants observed losing about 25 percent quality wky beyond 2 wk.

Source: *Maersk SeaLand*

**Table 5: Recommended Temperature, Relative Humidity, and Storage Period for Potted Plants Not Acclimated to Darkness**

Plant Common name/ Scientific name(s)	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
African Violet <i>Sainpaulia ionanatha</i>	21 to 24	70 to 75	—	—
Aglaonema <i>Aglaonema</i> spp.	16 to 21	60 to 70	65 to 85	10 days
Asparagus <i>Asparagus densiflorus sprengeri</i> , <i>Asparagus setaceus</i>	18 to 21	65 to 75	—	—
Azalea <i>Rhododendron</i> hybrid	16	60	—	3 days
Begonia <i>Begonia x hiemalis</i>	16 to 21	60 to 70	—	—
Bromeliads <i>Aechmea fasciata</i> , <i>Neoregelia</i> <i>carolinae tricolor</i>	21 to 27	70 to 80	—	—
Chrysanthemum <i>Chrysanthemum morifolium</i>	2	35	80 to 90	5 days
Cyclamen <i>Cyclamen persicum giganteum</i>	10	50	80 to 90	4 days
Dieffenbachia <i>Dieffenbachia</i> spp.	16 to 21	60 to 70	—	5 days
Dracaena <i>Dracaena</i> spp., <i>Cordyline terminalis</i>	16 to 24	60 to 75	—	7 days
Easter Lily <i>lilium longiflorum</i> , flower buds puffy, white, unopened	0 to 3	32 to 37	—	14 days
Ferns <i>Nephrolepis</i> spp., <i>Adiantum raddianum</i> , <i>Asplenium nidus</i> , <i>Pteris cretica</i> , <i>Pteris ensiformis</i>	16 to 24	60 to 75	75 to 85	7 days
Ficus <i>Ficus</i> spp.	13 to 21	55 to 70	65 to 85	7 days
Gloxina <i>Sinningia speciosa</i>	16	60	70 to 90	4 days
Hibiscus <i>Hibiscus rosa-sinensis</i>	18 to 24	65 to 75	—	—
Kalanchoe <i>Kalanchoe blossfeldiana</i>	16	60	—	4 days
Palm <i>Chrysaldocarpus lutescens</i> , <i>Chamaedorea erumpens</i> , <i>Chamaedorea elagans</i> , <i>Howeia forsteriana</i> , <i>Phoenix roebelenii</i>	10 to 21	50 to 70	65 to 75	10 days
Peperomia <i>Peperomia</i> spp.	16 to 24	60 to 75	65 to 85	7 days
Philodendron <i>Philodendron</i> spp.	16 to 24	60 to 75	65 to 85	7 days

**Table 5: Continued**

Plant Common name/ Scientific name(s)	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Poinsettia Euphorbia pulcherrima	10 to 12	50 to 54	—	4 days
Pothos Scindapsus aureus	16 to 24	60 to 75	65 to 85	7 days
Roses Rosa hybrida	1 to 3	34 to 37	—	5 days
Schefflera Brassaia actinophylla, Brassaia arboracola	13 to 18	55 to 65	—	7 days

Source: *Society of American Florists; McGregor.*

**Table 6: Recommended Temperature and Approximate Transit and Storage Period for Cut Flowers and Florist Greens**

Product	Temperature		Approximate Storage Life <sup>1</sup>
	°C	°F	
<b>Cut flowers<sup>2</sup></b>			
Acacia	4	40	3 to 4 days
Alstroemeria	4	40	2 to 3 days
Allium	0 to 2	32 to 35	2 wk
Anemone	4 to 7	40 to 45	2 days
Anthurium <sup>4</sup>	13	56	2 to 4 wk
Aster, China	0 to 4	32 to 40	1 to 3 wk
Bird-of-Paradise	7 to 8	45 to 46	1 to 3 wk
Bouvardia	0 to 2	32 to 35	1 wk
Buddleia	4	40	1 to 2 days
Calendula	4	40	3 to 6 days
Calla	4	40	1 wk
Camellia <sup>5</sup>	7	45	3 to 6 days
Candytuft	4	40	3 days
Carnation	-0.5 to 0.6	31 to 33	2 to 4 wk
Carnation buds	-0.5 to 0	31 to 32	4 to 12 wk
Carnation, miniature	-0.5 to 0	31 to 32	2 wk
Chrysanthemum	-0.5 to 0.6	31 to 33	2 to 4 wk
Clarkia	4	40	3 days
Columbine	4	40	2 days
Coreopsis	4	40	3 to 4 days
Cornflower	4	40	3 days
Cosmos	4	40	3 to 4 days
Crocus	0.5 to 2	33 to 36	1 to 2 wk
Dahlia	4	40	3 to 5 days
Daisy, English	4	40	3 days
Daisy, Marguerite	2	36	1 to 2 wk
Daisy, Shasta	4	40	1 wk
Delphinium	4	40	1 to 2 days
Eucharis <sup>5</sup>	7 to 10	45 to 50	7 to 10 days
Feverfew	4	40	3 days
Forget-Me-Not	4	40	1 to 2 days
Foxglove	4	40	1 to 2 days
Freesia	0 to 0.5	32 to 33	10 to 14 days



**Table 6: Continued**

Product	Temperature		Approximate Storage Life <sup>1</sup>
	°C	°F	
Gaillardia	4	40	3 days
Gardenia <sup>5</sup>	0 to 1	32 to 34	2 wk
Gerbera	1 to 4	34 to 40	1 to 2 wk
Ginger	13	55	4 to 7 days
Gladiolus, as buds	4 to 6	40 to 42	5 to 8 days
Gloriosa lily	4 to 7	40 to 45	1 wk
Godetia	10	50	1 wk
Gypsophila	4	40	1 to 3 wk
Heather	4	40	1 to 3 wk
Heliconia	12	54	10 days
Hyacinth	0 to 0.5	32 to 33	2 wk
Iris, bulbous	-0.5 to 0.6	31 to 33	1 to 2 wk
Laceflower	4	40	3 days
Lilac, forced	4	40	4 to 6 days
Lily, Easter	0 to 2	32 to 35	2 to 3 wk
Lily-of-the-Valley	-0.5 to 0.6	31 to 33	2 to 3 wk
Lupine	4	40	3 days
Marigolds	4	40	1 to 2 wk
Mignonette	4	40	3 to 5 days
Narcissus (daffodils)	0 to 0.5	32 to 33	1 to 3 wk
Orchid, cattelya <sup>4,5</sup>	7 to 10	45 to 50	1 to 2 wk
Orchid, cymbidium	-0.5 to 4	31 to 40	2 wk
Orchid, vanda	13	55	5 days
Orinthogalum	4	40	4 to 6 wk
Poppy	4	40	3 to 5 days
Peony, tight buds	0 to 2	32 to 35	4 to 6 wk
Phlox	4	40	1 to 3 days
Poinsettia	10 to 15	50 to 60	4 to 7 days
Primrose	4	40	1 to 2 days
Protea	4	40	7 to 10 days
Ranunculus	0 to 5	32 to 41	7 to 10 days
Rose (in preservative)	0.5 to 2	33 to 35	4 to 5 days
Rose (dry pack)	0	32	1 to 2 wk
Snapdragon	4	40	1 to 2 wk

**Table 6: Continued**

Product	Temperature		Approximate Storage Life <sup>1</sup>
	°C	°F	
Snowdrop	4	40	2 to 4 days
Squill	0 to 0.6	32 to 33	2 wk
Statice	2	35	2 to 3 wk
Stephanotis <sup>5</sup>	4	40	1 wk
Stevia	4	40	3 days
Stock	4	40	3 to 5 days
Strawflower, fresh	2	35	3 to 4 wk
Sweetpea	-0.5 to 0.6	31 to 33	2 wk
Sweet-William	7	45	3 to 4 days
Tulip	-0.5 to 0.6	31 to 33	2 to 3 wk
Violet	1 to 5	34 to 41	3 to 7 days
Zinnia	4	40	1 wk
<b>Florist greens (decorative foliage)<sup>2,3</sup></b>			
Adiantum (maidenhair)	0 to 4	32 to 40	—
Asparagus (plumosa) <sup>6</sup>	2 to 4	35 to 40	2 to 3 wk
Asparagus (sprenger) <sup>6</sup>	2 to 4	35 to 40	2 to 3 wk
Boxwood	2 to 4	35 to 40	1 to 2 mo
Camellia	4	40	—
Cedar	0	32	1 mo
Chamaedorea	7	45	2 to 3 wk
Cordyline (ti)	7 to 10	45 to 50	2 to 3 wk
Croton	2 to 4	35 to 40	—
Dieffenbachia	13	55	—
Dracaena	2 to 4	35 to 40	—
Dagger & wood ferns <sup>6</sup>	0	32	2 to 3 mo
Eucalyptus	2 to 4	35 to 40	1 to 3 wk
Galax <sup>6</sup>	0	32	—
Ground Pine <sup>6</sup>	0	32	—
Hedera	2 to 4	35 to 40	2 to 3 wk
Holly <sup>6</sup>	0 to 4	32 to 40	3 to 5 wk
Huckleberry	0	32	1 to 4 wk
Juniper	0	32	1 to 2 mo
Laurel, Mountain	0	32	2 to 4 wk
Leatherleaf (baker fern)	1 to 4	34 to 40	1 to 2 mo

**Table 6: Continued**

Product	Temperature		Approximate Storage Life <sup>1</sup>
	°C	°F	
Leucothoe, drooping	2 to 4	35 to 40	—
Magnolia	2 to 4	35 to 40	2 to 4 wk
Mistletoe	0	32	3 to 4 wk
Myrtus (myrtle)	2 to 4	35 to 40	—
Palm	7	45	—
Philodendron	2 to 4	35 to 40	—
Pittosporum	2 to 4	35 to 40	2 to 3 wk
Podocarpus	7	45	—
Pothos	2 to 4	35 to 40	—
Rhododendron	0	32	2 to 4 wk
Salal (lemon leaf) <sup>6</sup>	0	32	2 to 3 wk
Scotch-broom	4	40	2 to 3 wk
Smilax, southern <sup>6</sup>	4	40	—
Staghorn fern	13	55	—
Vaccinium (huckleberry) <sup>6</sup>	0	32	1 to 4 wk
Woodwardia fern	0 to 4	32 to 40	—

<sup>1</sup> Storage periods given should allow satisfactory handling and keeping after removal from storage.

<sup>2</sup> High relative humidity of 90 to 95 percent recommended in refrigerated storage rooms for cut flowers and florist greens. Likely, some flowers for which temperature of 4° is recommended could be stored longer and safely at lower temperatures.

<sup>3</sup> At retail level, florist greens held at approximately 4° for only 1 or 2 wk. Most stored with stems in water, except where noted otherwise.

<sup>4</sup> Stems of orchids and some anthuriums should be placed in vials of water. However, some orchids and anthuriums may be stored by dry-pack methods.

<sup>5</sup> Not placed in water for handling or storage but may be misted.

<sup>6</sup> Usually held in moisture-retentive shipping cases.

Source: *The Refrigeration Research and Education Foundation, Hardenburg, Watada, and Wang.*

**Table 7: Recommended Temperature and Relative Humidity, and Approximate Transit and Storage Life for Seafood, Meat, Dairy, and Egg Products**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
<b>Fish</b>				
Haddock, Cod, Perch	-1 to 1	31 to 34	95 to 100	12 days
Hake, Whiting	0 to 1	32 to 34	95 to 100	10 days
Halibut	-1 to 4	31 to 34	95 to 100	18 days
Herring, kippered, smkd	0 to 2	32 to 36	80 to 90	10 days
Mackerel	0 to 1	32 to 34	95 to 100	6 to 8 days
Menhaden	1 to 5	34 to 41	95 to 100	4 to 5 days
Salmon	-1 to 1	31 to 34	95 to 100	18 days
Tuna	0 to 2	32 to 36	95 to 100	14 days
Frozen fish	-29 to -23	-20 - -10	90 to 95	6 to 12 mo
<b>Shellfish</b>				
Clams (shucked meats)	-1.7	29	85-90	5 days
Crabmeat, pasteurized	0 to 1.1	32-34		6 mo
Crabs, King, Snow, ck, frz	-18	0		12 mo
Crabs, Dungeness, ck, frz	-18	0		3 to 6 mo
Scallop meat	0 to 1	32 to 34	95 to 100	12 days
Shrimp	-1 to 1	31 to 34	95 to 100	12 to 14 days
Lobster, American, live	5 to 10	41 to 50	in water	indefinite
Lobster, Amer fresh meat	-1.1 to 0	30 to 32	90 to 95	3 to 5 days
Lobster, Amer, froz, shell	0	-18		3 to 6 mo
Lobster, meat, ckd, frz	0	-18		6 to 9 mo
Lobster, Spiny, froz, shell	0	-18		10 to 12 mo
Oysters, meat, liq	0 to 2	32 to 36	100	5 to 8 days
Oysters, clams, in shell	5 to 10	41 to 50	95 to 100	5 days
Frozen shellfish	-29 to -20	-20 to -4	90 to 95	3 to 8 mo
<b>Meat (beef)</b>				
Beef, fresh, average	0 to 1	32 to 34	88 to 92	1 to 9 wk
Beef, carcass				
Choice, 60% lean	0 to 4	32 to 39	85 to 90	1 to 3 wk
Prime, 54% lean	0 to 1	32 to 34	85	1 to 3 wk
Sirloin, Round cut	0 to 1	32 to 34	85	1 to 9 wk
Dried, chipped	10 to 15	50 to 59	15	6 to 8 wk
Liver	0	32	90	1 to 7 days
Veal, 81% lean	0 to 1	32 to 34	90	1 to 7 days

**Table 7: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Frozen beef cuts	-29 to -18	-20 to 0	90 to 95	12 to 18 mo
<b>Meat (pork)</b>				
Pork, fresh, average	0 to 1	32 to 34	85 to 90	3 to 7 days
Carcass, 47% lean	0 to 1	32 to 34	85 to 90	3 to 5 days
Bellies, 35% lean	0 to 1	32 to 34	85	3 to 5 days
Backfat, 100% lean	0 to 1	32 to 34	90 to 95	3 to 8 wk
Frozen pork	-29 to -18	-20 to 0	90 to 95	8 to 10 mo
Ham, cured				
20.5% protein fat free	-3	26		3 mo
18.5% protein fat free	-3	26		3 mo
17% protein fat free	-3	26		2 mo
Frozen	-23 to -18	-10 to 0		2 to 3 mo
Ham, fresh, frozen	-23 to -18	-10 to 0		6 mo
Bacon				
Medium fat class	3 to 5	37 to 41	80 to 85	2 to 3 wk
Cured, farm style	16 to 18	61 to 64	85	4 to 6 mo
Cured, packer style	1 to 4	34 to 39	85	2 to 6 wk
Frozen	-23 to -18	-10 to 0	90 to 95	2 to 4 mo
<b>Sausage</b>				
Links or bulk	0 to 1	32 to 34	85	1 to 7 days
Country, smoked	0	32	85	1 to 3 wk
Frankfurters, average	0	32	85	1 to 3 wk
Polish style	0	32	85	1 to 3 wk
<b>Meat (lamb)</b>				
Fresh, average	0 to 1	32 to 34	85 to 90	5 to 12 days
Choice, 67% lean	0	32	85	5 to 12 days
Leg, choice, 83% lean	0	32	95	5 to 12 days
Frozen	-29 to -18	-20 to 0	90 to 95	12 to 18 mo
<b>Meat (poultry)</b>				
Poultry, fresh, average	-2 to 0	28 to 32	95 to 100	1 to 4 wk
Chicken, all classes	-2 to 0	28 to 32	95 to 100	1 to 4 wk
Turkey, all classes	-2 to 0	28 to 32	95 to 100	1 to 4 wk
Duck	-2 to 0	28 to 32	95 to 100	1 to 4 wk
Poultry, frozen	-23 to -18	-10 to 0	90 to 95	12 mo

**Table 7: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
<b>Rabbit meat, fresh</b>	0 to 1	32 to 34	90 to 95	1 to 5 days
<b>Meat (canned)</b>				
Non-perishable	-1 to 15.5	30 to 50	70 or below	variable
Perishable	-3 to -1	26 to 30	70 or below	variable
Meat (mech. separated)	-29 to -18	-20 to 0		1 to 6 mo
<b>Dairy products</b>				
Butter	0	32	70 to 75	1 mo
Butter, frozen	-23	-10	70 to 75	12 mo
<b>Cheese</b>				
Cheddar	0 to 1	32 to 34	65	12 mo
Blue	0 to 1	32 to 34	65	2 to 3 mo
Brie	0 to 1	32 to 34	65	2 mo
Brick	0 to 1	32 to 34	65	2 to 3 mo
Camembert	0 to 1	32 to 34	65	2 mo
Colby	0 to 3	32 to 38	65	6 mo
Cottage	0 to 1	32 to 34	65	2 to 3 wk
Cream, hot pack	0 to 1	32 to 34	65	4 wk
Limburger	0 to 1	32 to 34	65	2 to 3 mo
Mozzarella	0 to 1	32 to 34	65	6 to 8 wk
Parmesan	0 to 4	32 to 40	65	10 to 24 mo
Past. Process Cheese	0 to 4	32 to 40	65	6 to 10 mo
Past. Proc Cheese Food	0 to 4	32 to 40	65	6 to 10 mo
Romano	0 to 4	32 to 40	65	5 to 12 mo
Roquefort	0 to 1	32 to 34 4034	65	2 to 3 mo
Swiss	0 to 4	32 to 34	65	—
Frozen Dairy Desserts	-32 to -26	-15 to -25	—	5 mo
<b>Milk</b>				
Whole, past, Gr. A	0 to 1	32 to 34	—	2 to 4 mo
Dried, whole	7 to 21	45 to 70	low	6 to 9 mo
Dried, non-fat	7 to 21	45 to 70	low	6 to 9 mo
Evaporated	4	40	—	24 mo
Evaporated, unsweetened	21	70	—	12 mo
Condensed, sweetened	7	40	—	15 mo

**Table 7: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Cream, fresh, pasteurized	0 to 2.2	32 to 36		2 wk
Cream, sour	-2 to 0	28 to 32		3 mo
Cream, sweetened	-23	-10		several mo
Whey, dried	21	70	low	12 mo
<b>Eggs</b>				
Dried, white solids	21 to 27	70 to 80	75 max	Indefinite
Dried, whole or yolk solids	4 to 10	40 to 50	75 max	1 to 2 years
Shell	-2 to -0.6	29 to 31	85 to 92	5 to 6 mo
Frozen	0	32	—	1 year plus

Source: *The Refrigeration Research and Education Foundation, 1996; American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc., 1994.*

**Table 8: Recommended Temperature and Relative Humidity, and Approximate Transit and Storage Life for Miscellaneous Products**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
<b>Candy</b>				
Milk chocolate	-18 to 0	0 to 32	40	6 to 12 mo
Peanut brittle	-18 to 0	0 to 32	40	1 to 6 mo
Fudge	-18 to 0	0 to 32	65	12 mo
Marshmallows	-18 to 0	0 to 32	65	6 to 9 mo
<b>Other Products</b>				
Alfalfa meal	-18	0	70 to 75	1 year plus
<b>Beer</b>				
Keg	3.3	38	—	6 wk
Bottles, cans, pasteur	4	40	65 max	6 to 8 wk mo
Bottles, cans, non-past	3.3	38	65 max	12 wk
<b>Bakery Products, frozen</b>				
Breads, yeast, frz	-18	0	—	2 to 6 mo to 13 weeks
Breads, quick, frz	-18	0		2 to 6 mo
Cakes, frz	-18	0		2 to 6 mo
Cookies	-18	0		4 to 12 mo
Croissants	-18	0		2 to 4 mo
Dough	-18	0		3 mo
Doughnuts	-18	0		2 to 3 mo
Pastries	-18	0		2 to 3 mo
Pies	-18	0		3 to 12 mo
Canned goods	0 to 16	32 to 60	70	3 years
Cocoa	0 to 4	32 to 40	50 to 70	1 year plus
Coffee, green beans	1.7 to 4.4	35 to 40	40 to 60	2 to 3 mo
Flour	0 to 4.4	32 to 40	—	1 year
Fur and fabrics	1 to 4	34 to 40	45 to 55	several years
Hides	-1 to 2	30 to 36	80 to 90	several years
Honey, comb	5.6 to 6.7	42 to 44	85	1 to 3 mo
Honey, strained	0 to 4.4	32 to 40	85	6 mo
Honey, frozen	-18	0	40	several years
Hops	-4.4 to -2.2	24 to 28	70 to 85	12 mo
Lard, w/o antioxidant	7	45	90 to 95	4 to 8 mo
Maple syrup	-18	0	90 to 95	12 to 14 mo
Nuts	0 to 10	32 to 50	65 to 75	8 to 12 mo



**Table 8: Continued**

Product	Temperature		Relative Humidity (%)	Approximate Storage Life
	°C	°F		
Oil, vegetable, salad	21	70	—	1 year plus
Margarine	-12 to -8	10 to 18	40 to 60	6 mo
Orange Juice, frz	-18	0	—	1 year
Popcorn, unpopped	0 to 4	32 to 40	85	4 to 6 wk
Yeast, dry	3.9 max	39 max	60 to 70	6 to 12 mo
Yeast, fresh	-1.1 to 0	30 to 32	80 to 90	1 to 2 wk
Tobacco				
Hogshead	10 to 18	50 to 65	50 to 65	1 year
Bales	2 to 4	35 to 40	70 to 85	1 to 2 years
Cigarettes	2 to 8	35 to 46	50 to 55	6 mo
Cigars	2 to 10	35 to 50	60 to 65	2 mo

Source: *American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc.*

**Table 9: Products Sensitive to Chilling Injury  
(when held below their recommended temperature)**

atemoya	grapefruit	plantain
avocados	guava	pomegranates
babaco	haricot vert	potatoes
bananas	jaboticaba	potted plants
beans	jackfruit	pummelo
bitter melon	jicama	pumpkins
black sapote	kiwano	rambutan
boniato	langsai	santol
breadfruit	lemons	sapodilla
calabaza	limes	soursop
calamondin	malanga	squash
canistel	mamey	sugar apple
cantaloupes	mangoes	sweet potatoes
carambola	mangosteen	tamarillo
chayote	melons	tamarind
cherimoya	okra	taro root
cranberries	olive	tomatillo
cucumbers	oranges (CA & AZ)	tomatoes
custard apple	papaya	tropical flowers
eggplant	passion fruit	ugli™ tangelo
feijoa	pepino	watermelons
ginger root	peppers	yam
granadilla	pineapples	

Source: *Hardenburg, Watada, and Wang; McGregor.*

**Table 10: Products Susceptible to Freezing Injury  
(from one or more light freezings)**

**Most Susceptible**

---

apricots	eggplant	peppers, sweet
asparagus	lemons	plums
avocados	lettuce	potatoes
bananas	limes	squash, summer
beans, snap	okra	sweetpotatoes
berries (except cranberries)	peaches	tomatoes
cucumbers		

**Moderately Susceptible**

---

apples	cranberries	pears
broccoli, sprouting	grapefruit	peas
cabbage, new	grapes	radishes, w/o tops
carrots w/o tops	onions (dry)	spinach
cauliflower	oranges	squash, winter
celery	parsley	

**Least Susceptible**

---

beets w/o tops	kale	rutabagas
brussels sprouts	kohlrabi	salsify
cabbage, mature or savory	parsnips	turnips w/o tops
dates		

The most susceptible products will be injured by one light freezing, moderately susceptible products will recover from one or two light freezings, while least susceptible products can be lightly frozen several times. Fresh products that are lightly frozen should not be handled. Thawing should be done at 4° C (40° F).

Source: *Hardenburg, Watada, and Wang.*

**Table 11: Top-Icing of Products  
(that have high respiration rates, need high relative humidity and benefit from top-ice on top of the load or within individual boxes)**

**Should Be Top-Iced**

beets with tops  
broccoli  
carrots with tops  
corn, sweet  
endive  
escarole  
green onions  
parsley  
radishes with tops  
turnips with tops  
watercress  
radish greens  
spinach  
turnip greens  
turnips

**Can Be Top-Iced**

artichokes, globe  
beet greens  
beets, topped  
brussels sprouts  
cantaloups  
carrots, topped  
celeriac  
chard  
kohlrabi  
leeks  
mustard greens  
parsnips  
radishes  
rutabagas

Source: *Safeway Stores, Inc.*

**Table 12: Moisture Loss Rate of Products  
(showing the need for high relative humidity and top-icing)**

**High Loss Rate**

---

apricots	green onions*	peaches
blackberries	guavas	persimmons
broccoli*	kohlrabi	pineapples
cantaloupes*	leafy greens*	plums and prunes
chard*	lychees	raspberries
cherries	mangoes	strawberries
Chinese vegetables	mushrooms	cut flowers
figs	papayas	vegetables with tops*
grapes	parsley*	

**Medium Loss Rate**

---

avocados	cranberries	pears
artichokes*	endive*	peas
asparagus	escarole*	peppers
bananas	grapefruit	pomegranates
beets*	green beans	quinces
brussels sprouts*	leeks*	radishes*
cabbage*	lemons	rhubarb
carrots, topped*	lettuce	rutabagas*
cauliflower, unwrapped	limes	sweet potatoes
celeriac*	nectarines	squash, summer (soft shell)
celery*	okra	tangerines
coconuts	oranges	tomatoes
corn, sweet*	parsnips*	yams

**Low Loss Rate**

---

apples	garlic	onions, dry
cauliflower, wrapped	ginger root	potatoes
cucumbers, waxed	kiwifruit	pumpkins
eggplant	melons	squash, winter (hard shell)

\* Can be top-iced.

Source: *Safeway Stores, Inc.*

**Table 13: Products That Are Ethylene Producers or Ethylene-Sensitive  
(and should not be mixed, to avoid premature ripening or injury)**

**Ethylene Producers**

---

apples	kiwifruit, ripe	persimmons
apricots	mamey	plantains
avocados	mangoes	plums
bananas, ripening	mangosteen	prunes
cantaloupes	nectarines	quinces
cherimoya	papayas	rambutan
figs	passion fruit	tomatoes
guavas	peaches	
honeydew melons	pears	

**Ethylene Sensitive**

---

bananas, unripe	cut flowers	peas
Belgian endive	eggplant	peppers
broccoli	florist greens	potted plants
brussels sprouts	green beans	spinach
cabbage	kiwifruit, unripe	squash
carrots	leafy greens	sweet potatoes
cauliflower	lettuce	watercress
chard	okra	watermelon
cucumbers	parsley	yams

Source: *Safeway Stores, Inc.; McGregor; Maersk SeaLand.*

**Table 14: Products Which Produce or Absorb Odors  
(and should not be mixed)**

<b>Odor produced by</b>	<b>Will be absorbed by</b>
apples	cabbage, carrots, celery, figs, onions, meat, eggs, dairy products
avocados	pineapples
carrots	celery
citrus fruit	meat, eggs, dairy products
ginger root	eggplant
grapes fumigated with sulfur dioxide	other fruits and vegetables
leeks	figs, grapes
onions, dry	apples, celery, pears
onions, green	corn, figs, grapes, mushrooms, rhubarb
pears	cabbage, carrots, celery, onions, potatoes
potatoes	apples, pears
peppers, green	pineapples
“strongly scented vegetables”	citrus fruit

Source: *Hardenburg, Watada, and Wang.*

## Table 15: Compatibility Groups

Group 1: Fruits and vegetables, 0° to 2° C (32° to 36° F), 90-95 percent relative humidity. Many products in this group produce ethylene.

apples	grapes (without sulfur dioxide)	parsnips
apricots	horseradish	peaches
Asian pears	kohlrabi	pears
Barbados cherry	leeks	persimmons
beets, topped	longan	plums
berries (except cranberries)	loquat	pomegranates
cashew apple	lychee	prunes
cherries	mushrooms	quinces
coconuts	nectarines	radishes
figs (not with apples)	oranges <sup>1</sup> (FL & TX)	rutabagas
		turnips

<sup>1</sup>Citrus treated with biphenyl may give odors to other products.

Group 2: Fruits and vegetables, 0° to 2° C (32° to 36° F), 95-100 percent relative humidity. Many products in this group are sensitive to ethylene.

amaranth <sup>1</sup>	cherries	parsley <sup>1</sup>
anise <sup>1</sup>	corn, sweet <sup>1</sup>	parsnips <sup>1</sup>
artichokes <sup>1</sup>	diakon <sup>1</sup>	peas <sup>1</sup>
asparagus	endive <sup>1</sup>	pomegranate
bean sprouts	escarole <sup>1</sup>	raddichio
beets <sup>1</sup>	grapes (without sulfur dioxide)	radishes <sup>1</sup>
Belgian endive	horseradish	rhubarb
berries (except cranberries)	Jerusalem artichoke	rutabagas <sup>1</sup>
bok choy	kiwifruit	salsify
broccoli <sup>1</sup>	kohlrabi	scorzonera
brussels sprouts <sup>1</sup>	leafy greens	snow peas
cabbage <sup>1</sup>	leeks <sup>1</sup> (not with figs or grapes)	spinach <sup>1</sup>
carrots <sup>1</sup>	lettuce	turnips <sup>1</sup>
cauliflower	lo bok	water chestnuts
celeriac <sup>1</sup>	mushrooms	watercress <sup>1</sup>
celery <sup>1</sup>	onions, green <sup>1</sup> (not with figs, grapes, mushrooms, rhubarb, or corn)	

<sup>1</sup>These products can be top-iced.

Group 3: Fruits and vegetables, 0° to 2° C (32° to 36° F), 65-75 percent relative humidity. Moisture will damage these products.

garlic	onions, dry
--------	-------------



Group 4: Fruits and vegetables, 4.5° C (40° F), 90-95 percent relative humidity.

cactus leaves	lemons <sup>1</sup>	tamarillo
cactus pears	lychees	tangelos <sup>1</sup>
caimito	kumquat	tangerines <sup>1</sup>
cantaloupes <sup>2</sup>	mandarin <sup>1</sup>	Ugli™ tangelo <sup>1</sup>
clementine	oranges <sup>1</sup> (CA and AZ)	yucca root
cranberries	pepino	

<sup>1</sup>Citrus treated with biphenyl may give odors to other products.

<sup>2</sup>Can be top-iced.

Group 5: Fruits and vegetables, 10° C (50° F), 85-90 percent relative humidity. Many of these products are sensitive to ethylene. These products also are sensitive to chilling injury.

beans	kiwano	potatoes, storage
calamondin	malanga	pummelo
chayote	okra	squash, summer (soft shell)
cucumber	olive	tamarind
eggplant	peppers	taro root
haricot vert		

Group 6: Fruits and vegetables, 13° to 15° C (55° to 60° F), 85-90 percent relative humidity. Many of these products produce ethylene. These products also are sensitive to chilling injury.

atemoya	ginger root	papayas
avocados	granadilla	passionfruit
babaco	grapefruit	pineapple
bananas	guava	plantain
bitter melon	jaboticaba	potatoes, new
black sapote	jackfruit	pumpkin
boniato	langsat	rambutan
breadfruit	lemons <sup>1</sup>	santol
canistel	limes <sup>1</sup>	soursop
carambola	mamey	sugar apple
cherimoya	mangoes	squash, winter (hard shell)
coconuts	mangosteen	tomatillos
feijoa	melons (except cantaloupes)	tomatoes, ripe

<sup>1</sup>Citrus treated with biphenyl may give odors to other products.

Group 7: Fruits and vegetables, 18° to 21° C (65° to 70° F), 85-90 percent relative humidity.

jicama	tomatoes, mature green	white sapote
pears (for ripening)	watermelon <sup>1</sup>	yams <sup>1</sup>
sweet potatoes <sup>1</sup>		

<sup>1</sup>Separate from pears and tomatoes due to ethylene sensitivity.

Group 8: Flowers and florist greens, 0° to 2° C (32° to 36° F), 90-95 percent relative humidity.

**Flowers**

---

allium	freesia	peony, tight buds
aster, China	gardenia	ranunculus
bouvardia	hyacinth	rose
carnation	iris, bulbous	squill
chrysanthemum	lily	sweet pea
crocus	lily-of-the-valley	tulip
cymbidium orchid	narcissus	

**Florist Greens**

---

adiantum (maidenhair)	woodwardia fern	mountain-laurel
cedar	ground pine	rhododendren
dagger and wood	ilex (holly)	salal (lemon leaf)
ferns	juniper	vaccinium (huckleberry)
galax	mistletoe	

Group 9: Flowers and florist greens, 4.5° C (40° F), 90-95 percent relative humidity.

**Flowers**

---

acacia	feverfew	ornithogalum
alstromeria	forget-me-not	poppy
anemone	foxglove	phlox
aster, China	gaillardia	primrose
buddleia	gerbera	protea
calendula	gladiolus	ranunculus
calla	gloriosa	snapdragon
candytuft	gypsophilla	snowdrop
clarkia	heather	statice
columbine	laceflower	stephanotis
coreopsis	lilac, forced	stevia
cornflower	lupine	stock
cosmos	marigolds	strawflower
dahlia	mignonette	violet
daisies	orchid, cymbidium	zinnia
delphinium		

**Florist Greens**

---

adiantum (maidenhair)	hedera	philodendron
asparagus (plumosa, sprenger)	ilex (holly)	pittosporum
buxus (boxwood)	leatherleaf (baker fern)	pothos
camellia	leucothoe, drooping	scotch-broom
croton	magnolia	smilax, southern
dracaena	myrtus (myrtle)	woodwardia fern
eucalyptus		

Group 10: Flowers and florist greens, 7° to 10° C (45° to 50° F), 90-95 percent relative humidity.

**Flowers**

---

anemone	eucharis	orchid, cattleya
bird-of-paradise	gloriosa	sweet william
camellia	godetia	

**Florist Greens**

---

chamaedora	podocarpus	palm
cordyline (ti)		

Group 11: Flowers and florist greens, 13° to 15° C (55° to 60° F), 90-95 percent relative humidity.

**Flowers**

---

anthurium  
ginger

heliconia  
orchid, vanda

poinsettia

**Florist Greens**

---

dieffenbachia

staghorn fern

Source: *Lipton and Harvey; Hardenburg, Watada, and Wang; McGregor.*

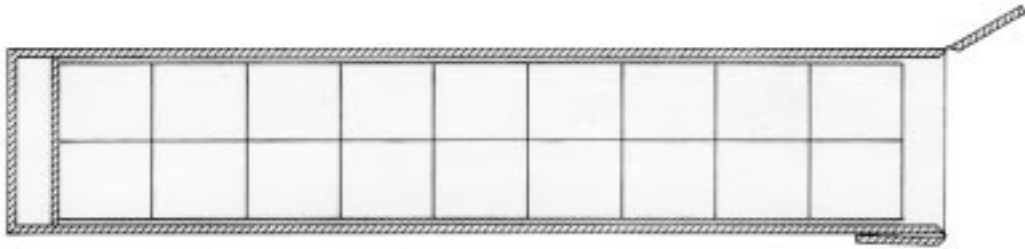


Figure 1: Top view of pattern for straight in-loading of palletized unit loads. Centerline loading of the pallets is recommended in equipment with flat side walls.

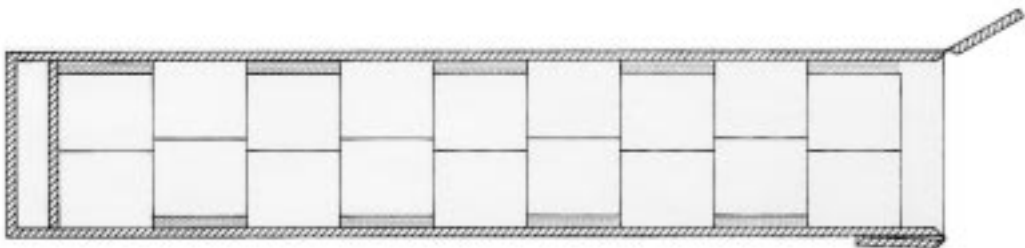


Figure 2: Top view of an offset loading pattern for straight in-loading of palletized unit loads to reduce wall contact in equipment with flat side walls. Centerline loading is preferred.

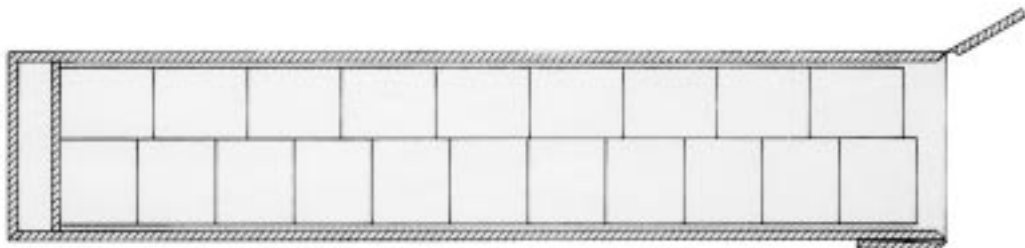


Figure 3: Top view of pattern for alternate loading of pallets used to increase the number of pallet loads when the weight of the product permits. In equipment with top-air delivery and shallow floors, it is necessary that the pallets have adequate openings along all four sides for air circulation and forklift and pallet jack entry. Double-faced block pallets should be used for this type of loading.

## Header stack at front of trailer.

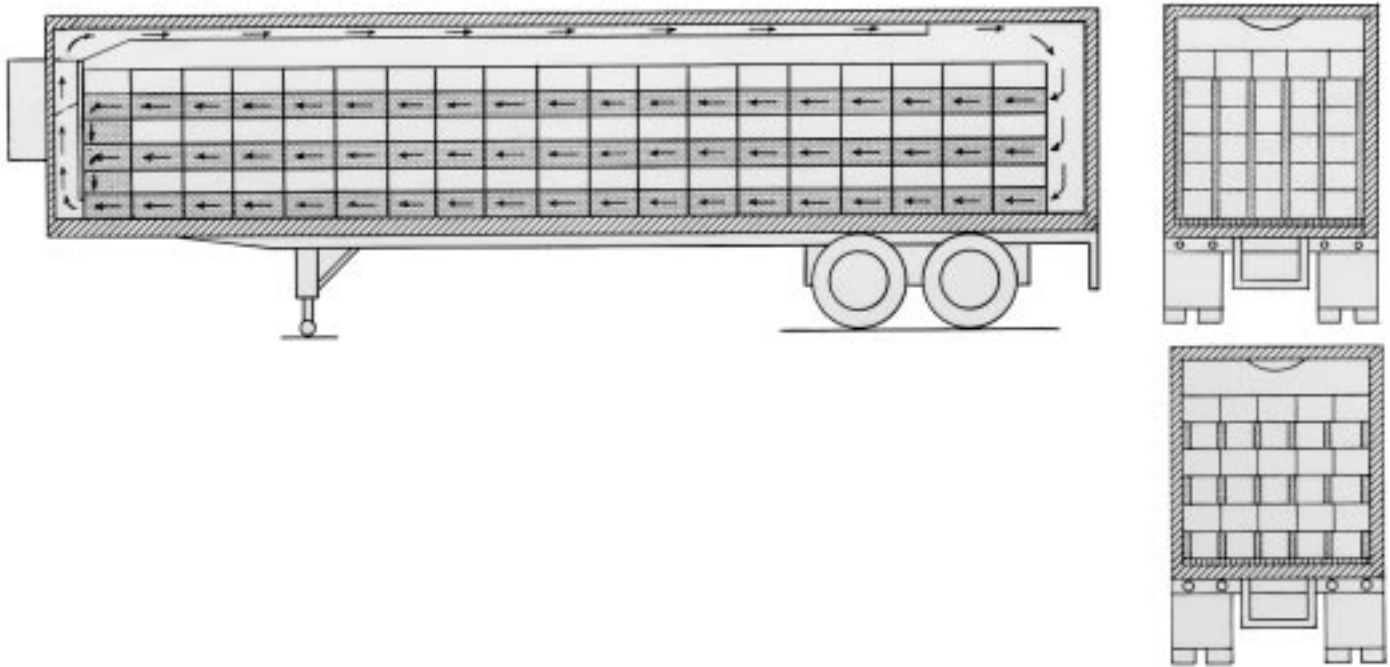


Figure 4: Side, end, and detail views of the recommended air-flow hand loading pattern for trailers or containers with top-air delivery. The boxes must be strong enough to permit offset stacking without crushing. A solid return air bulkhead must be installed at the front to prevent air from bypassing the load. A header stack is needed at the front of the trailer or container to connect the horizontal air channels and allow the air to return to the evaporator. Pallets should be used in equipment with shallow grooved floors.

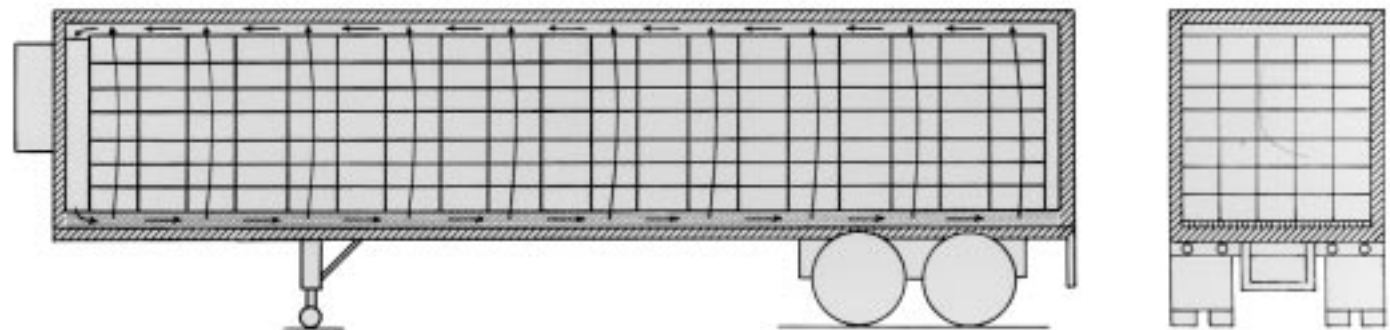


Figure 5: Side and end view of the recommended vertical air-flow hand loading pattern for bottom-air delivery trailers and containers. A solid return air bulkhead is a necessary feature of this system. The floor channels at the rear of the load must be blocked to force air through the load. Many researchers, shippers, and carriers feel that the bottom-air delivery system provides for easier loading and more even product temperatures.

## Export Advice and Assistance

Whether a company is in the beginning stages of market research or is an experienced exporter, information and assistance are available from a variety of sources. This section lists some of the State and Federal resources available to agricultural exporters, organized by the type of assistance offered. Resource categories are State department of agriculture and associated organizations; general market research and market trends; foreign market information; export assistance programs and services; foreign country import requirements; U.S. export requirements; U.S. export inspection, grading, and certification; export transportation; export financing; trade policy; other; and the trade information center.

### State Departments of Agriculture

The State departments of agriculture and associated organizations are listed first because they are an excellent starting point when looking for assistance on any agricultural trade-related question or issue.

#### ALABAMA

Department of Agriculture and Industries  
Division of Marketing  
P.O. Box 3336, Beard Building  
Montgomery, AL 36109-0336  
Phone: (334) 240-7100  
FAX: (334) 240-7190  
Web site: <http://agri-ind.state.al.us>

#### ALASKA

Department of Natural Resources  
Division of Agriculture  
P.O. Box 949, 1800 Glenn Highway, Suite 12  
Palmer, AK 99645-0949  
Phone: (907) 745-7200  
FAX: (907) 745-7112  
Web site: <http://www.dnr.state.ak.us/ag>

#### ARIZONA

Department of Agriculture  
Office of Commodity Development and Promotion  
1688 West Adams  
Phoenix, AZ 85007  
Phone: (602) 542-0978  
FAX: (602) 542-0969  
Web site:  
<http://www.agriculture.state.az.us/CD&P/CD&P.htm>

#### ARKANSAS

Industrial Development Commission  
One Capitol Mall  
Little Rock, AR 72201  
Phone: (501) 682-1121  
FAX: (501) 682-7341  
Trade and International Investment Division  
Phone: (501) 682-3571  
FAX: (501) 682-9585  
Web site: <http://www.aedc.state.ar.us>

#### CALIFORNIA

Department of Food and Agriculture  
Agricultural Export Program  
1220 N Street, Suite A-280  
Sacramento, CA 95814  
Phone: (916) 654-0389  
FAX: (916) 653-2604  
Web site: <http://www.cdffa.ca.gov>

#### COLORADO

Department of Agriculture  
Division of Markets  
700 Kipling Street  
Suite 4000  
Lakewood, CO 80215-5894  
Phone: (303) 239-4114  
FAX: (303) 239-4125  
Web site: <http://www.ag.state.co.us/mkt/mkt.html>

#### CONNECTICUT

Department of Agriculture  
Marketing & Technology Bureau  
765 Asylum Avenue  
Hartford, CT 06105  
Phone: (860) 713-2500  
FAX: (860) 713-2514  
Web site: <http://www.state.ct.us/doag>

#### DELAWARE

Department of Agriculture  
Division of Information, Education & Marketing  
2320 South Dupont Highway  
Dover, DE 19901  
Phone: (302) 739-4811  
FAX: (302) 697-6287  
Web site: <http://www.state.de.us/deptagri/index.htm>

#### FLORIDA

Department of Agriculture and Consumer Services  
Division of Marketing and Development  
545 East Tennessee Street  
Tallahassee, FL 32308-4981  
Phone: (805) 487-8000  
FAX: (850) 922-2189  
Web site: <http://www.fl-ag.com/exports.htm>

#### GEORGIA

Department of Agriculture  
International Trade Division  
340 Agriculture Building, Capitol Square  
Atlanta, GA 30334-2001  
Phone: (404) 656-3740  
FAX: (404) 656-9380  
Web site: [http://www.agr.state.ga.us/html/international\\_trade.html](http://www.agr.state.ga.us/html/international_trade.html)

#### HAWAII

Department of Agriculture  
Market Development Branch  
P. O. Box 22159  
Honolulu, HI 96823  
Phone: (808) 973-9595  
FAX: (808) 973-9590  
Web site: <http://www.hawaiiag.org/hdoa/>

#### IDAHO

Department of Agriculture  
Division of Marketing & Administration  
2270 Old Penitentiary Road  
Boise, ID 83712  
Phone: (208) 332-8530  
FAX: (208) 334-2879  
Web site:  
<http://www.agri.state.id.us/marketing/index.htm>

#### ILLINOIS

Department of Agriculture  
Marketing and Promotion  
P.O. Box 19281  
Springfield, IL 62794-9281  
Phone: (217) 782-6675  
FAX: (217) 524-5960  
Web site:  
<http://www.agr.state.il.us/marketing/index.html>

#### INDIANA

Office of the Commissioner of Agriculture  
150 West Market, Suite 414  
Indianapolis, IN 46204  
Phone: (317) 233-4459  
FAX: (317) 233-1680  
Web site: <http://www.state.in.us/oca/>

#### IOWA

Department of Economic Development  
International Marketing Division  
200 East Grand Avenue  
Des Moines, IA 50319  
Phone: (515) 242-4743  
FAX: (515) 242-4918  
Web site: <http://www.state.ia.us/international>

#### KANSAS

Department of Commerce & Housing  
Agriculture Products Development Division  
700 Southwest Harrison, Suite 1300  
Topeka, KS 66603  
Phone: (785) 296-3481  
FAX: (785) 296-3665  
Web site: <http://www.kansascommerce.com/>

#### KENTUCKY

Department of Agriculture  
Office for Agricultural Marketing and Product  
Promotion  
500 Mero Street, 7th Floor  
Frankfort, KY 40601  
Phone: (502) 564-4696  
FAX: (502) 564-2133  
Web site: [http://www.kyagr.com/mkt\\_promo](http://www.kyagr.com/mkt_promo)

#### LOUISIANA

Department of Agriculture and Forestry  
International Marketing Division  
P.O. Box 3334  
Baton Rouge, LA 70821-3334  
Phone: (225) 922-1280  
FAX: (504) 922-1289  
Web site: <http://www.ldaf.state.la.us/>



## MAINE

Department of Agriculture, Food, and Rural Resource  
Division of Development - Marketing  
28 State House Station  
Augusta, ME 04333-0028  
Phone: (207) 287-9072  
FAX: (207) 287-5576  
Web site: <http://www.state.me.us/agriculture/homepage.htm>

## MARYLAND

Department of Agriculture  
Marketing Services  
50 Harry S. Truman Parkway  
Annapolis, MD 21401-8960  
Phone: (410) 841-5770  
FAX: (410) 841-5987  
Web site: <http://www.mda.state.md.us/>

## MASSACHUSETTS

Department of Food and Agriculture  
Foreign Trade  
100 Cambridge Street, 21st Floor  
Boston, MA 02202  
Phone: (617) 727-3018, ext. 172  
FAX: (617) 727-7235  
Web site: <http://www.massdfa.org/agricult.htm>

## MICHIGAN

Department of Agriculture  
Market Development Division  
P.O. Box 30017  
611 West Ottawa, Fourth Floor  
Lansing, MI 48909  
Phone: (517) 373-1058  
FAX: (517) 335-7071  
Web site: <http://www.michigan.gov/mda>

## MINNESOTA

Trade Office  
1000 World Trade Center  
30 East Seventh Street  
Saint Paul, MN 55101-4902  
Phone: (651) 297-4222  
FAX: (651) 296-3555  
-or-  
Department of Agriculture  
Marketing & Development Division  
90 West Plato Boulevard  
Saint Paul, MN 55107-2094  
Phone: (651) 297-2301  
FAX: (612) 296-6890  
Web site: <http://www.mda.state.mn.us>

## MISSISSIPPI

Department of Agriculture and Commerce  
International Trade  
P.O. Box 1609  
Jackson, MS 39215-1609  
Phone: (601) 359-1158  
FAX: (601) 354-6001  
Web site: <http://www.mdac.state.ms.us>

## MISSOURI

Department of Agriculture  
Market Development Division  
International Marketing Program  
P.O. Box 630  
1616 Missouri Boulevard  
Jefferson City, MO 65102  
Phone: (573) 751-4338  
FAX: (573) 751-2868  
Web site: <http://www.mda.state.mo.us/c.htm>

## MONTANA

Department of Agriculture  
Agricultural Development Division  
P.O. Box 200201  
Helena, MT 59620-0201  
Phone: (406) 444-2402  
FAX: (406) 444-94492  
Web site: <http://www.agr.state.mt.us>

## NEBRASKA

Department of Agriculture  
Agricultural Promotion and Development Division  
301 Centennial Mall, South  
P.O. Box 94947  
Lincoln, NE 68509-4947  
Phone: (402) 471-4876  
FAX: (402) 471-2759  
Toll free (800) 422-6692  
Web site: <http://www.agr.state.ne.us>

## NEVADA

Department of Business and Industry  
Division of Agriculture  
Administrator  
350 Capitol Hill Avenue  
Reno, NV 89502  
Phone: (775) 688-1180  
FAX: (775) 688-1178  
Web site: <http://agri.state.nv.us>

NEW HAMPSHIRE  
Department of Agriculture  
Division of Agricultural Development  
P.O. Box 2042  
Concord, NH 03302-2042  
Phone: (603) 271-3788  
FAX: (603) 271-1109  
Web site: <http://www.state.nh.us/agric/agde.html>

NEW JERSEY  
Department of Agriculture  
Division of Markets  
John Fitch Plaza  
P.O. Box 330  
Trenton, NJ 08625-0330  
Phone: (609) 292-5536  
FAX: (609) 984-5367  
Web site: <http://www.state.nj.us/agriculture>

NEW MEXICO  
Department of Agriculture  
Marketing and Development Division  
P.O. Box 30005, Department 5600  
3190 South Espina - NMSU  
Las Cruces, NM 88003-8005  
Phone: (505) 646-4929  
FAX: (505) 646-3303  
Web site: <http://nmdaweb.nmsu.edu/>

NEW YORK  
Department of Agriculture and Markets  
Division of Agricultural Protection and Development  
Services  
1 Winners Circle  
Albany, NY 12235-0001  
Phone: (518) 457-7076  
FAX: (518) 457-2716  
Web site: <http://www.agmkt.state.ny.us/ap/aphome.html>

NORTH CAROLINA  
Department of Agriculture  
Division of Marketing  
P.O. Box 27647  
Raleigh, NC 27611  
Web site: <http://www.agr.state.nc.us>

-or-  
Division of Marketing  
2 West Edenton Street  
Raleigh, NC 27601  
Phone: (919) 733-7125  
FAX: (919) 733-0999

NORTH DAKOTA  
Department of Agriculture  
Marketing Division  
600 East Boulevard, Sixth Floor  
Bismarck, ND 58505-0020  
Phone: (701) 328-2231  
FAX: (701) 328-4567  
Web site: <http://www.state.nd.us/agr/>

OHIO  
Department of Agriculture  
International Trade Programs  
8995 East Main Street  
Reynoldsburg, OH 43068  
Phone: (614) 466-6198  
FAX: (614) 644-5017  
Web site: <http://www.state.oh.us/agr/>

OKLAHOMA  
Department of Agriculture  
International Marketing Section  
P.O. Box 528804  
Oklahoma City, OK 73152  
Phone: (405) 521-3864  
FAX: (405) 521-4912  
Web site: <http://www.state.ok.us/~okag/>

OREGON  
Department of Agriculture  
Agricultural Development and Marketing Division  
1207 Northwest Naito Parkway, Suite 140  
Portland, OR 97209-2832  
Phone: (503) 872.6600  
FAX: (503) 872-6601  
Web site: <http://www.oda.state.or.us>

PENNSYLVANIA  
Department of Agriculture  
Domestic and International Trade Division  
2301 North Cameron Street, Room 310  
Harrisburg, PA 17110-9408  
Phone: (717) 787-4210  
FAX: (717) 787-1858  
Web site: <http://www.pda.state.pa.us>

PUERTO RICO  
Department of Agriculture  
Agricultural Services and Development Administration,  
Marketing Program  
P. O. Box 10163  
Santurce, PR 00908-1163  
Phone: (787) 722-0871  
FAX: (809) 723-9747

#### RHODE ISLAND

Department of Environmental Management  
Division of Agriculture  
235 Promenade Street  
Providence, RI 02908-5767  
Phone: (401) 222-2781  
FAX: (401) 222-6047  
Web site: <http://www.state.ri.us/dem/programs/bnatres/agricult/index.htm>

#### SOUTH CAROLINA

Department of Agriculture  
International Trade  
Wade Hampton State Office Building  
P.O. Box 11280  
Columbia, SC 29211  
Phone: (803) 734-2200  
FAX: (803) 734-2192  
Web site: <http://www.scd.a.state.sc.us>

#### SOUTH DAKOTA

Department of Agriculture  
Division of Agricultural Marketing  
Foss Building  
523 East Capitol Avenue  
Pierre, SD 57501  
Phone: (605) 773-5436  
FAX: (605) 773-3481  
Web site: <http://www.state.sd.us/doa/doa.html>

#### TENNESSEE

Department of Agriculture  
Marketing Development Division  
P.O. Box 40627,  
Nashville, TN 37204  
Phone: (615) 837-5160  
FAX: (615) 837-5794  
Web site: <http://www.state.tn.us/agriculture>

#### TEXAS

Department of Agriculture  
Marketing and Promotion  
P.O. Box 12847  
Austin, TX 78711  
Phone: (512) 463-7624  
FAX: (512) 463-7843  
Web site: <http://www.agr.state.tx.us>

#### UTAH

Department of Agriculture  
Marketing and Promotion  
350 North Redwood Road, P.O. Box 146500  
Salt Lake City, UT 84114-6500  
Phone: (801) 538-7100  
FAX: (801) 538-7126  
Web site: <http://www.ag.state.ut.us>

#### VERMONT

Department of Agriculture, Food, and Markets  
Agricultural Development Division  
116 State Street  
Montpelier, VT 05620-2901  
Phone: (802) 828-2416  
FAX: (802) 828-3831  
Web site: <http://www.state.vt.us/agric/>

#### VIRGIN ISLANDS

Department of Agriculture  
Estate Lower Love-Kings Hill  
St. Thomas, Virgin Islands 00850  
Phone: (304) 778-0991  
FAX: (304) 778-3101

#### VIRGINIA

Department of Agriculture and Consumer Services  
Office of International Marketing  
1100 Bank Street, Suite 915  
Richmond, VA 23219  
Phone: (804) 786-3953  
FAX: (804) 225-4434  
Web site: <http://www.vdacs.state.va.us>

#### WASHINGTON STATE

Department of Agriculture  
International Marketing  
1111 South Washington Street  
P.O. Box 42560  
Olympia, WA 98504-2560  
Phone: (360) 902-1915  
FAX: (360) 902-2089  
Web site: <http://www.wa.gov/agr>

#### WEST VIRGINIA

Department of Agriculture  
Marketing and Development Division  
1900 Kanawha Boulevard, East  
Charleston, WV 25305-0178  
Phone: (304) 558-2210  
FAX: (304) 558-2270  
Web site:  
<http://www.state.wv.us/agriculture/home/home.html>

## WISCONSIN

Department of Agriculture, Trade, and Consumer Protection

Marketing Division

2811 Agriculture Drive

P.O. Box 8911

Madison, WI 53708-8911

Phone: (608) 224-5100

FAX: (608) 224-5110

International Agribusiness Center

Phone: (608) 224-5117

Toll free: (800) 462-5237

Web site: <http://datcp.state.wi.us/>

## WYOMING

Department of Agriculture

Marketing Division

2219 Carey Avenue

Cheyenne, WY 82002-0100

Phone: (307) 777-6577

FAX: (307) 777-6593

Web site: <http://wyagric.state.wy.us/>

National Association of State Departments of Agriculture (NASDA)

1156 15th Street, NW, Suite 1020

Washington, DC 20005

Phone: (202) 296-9680

FAX: (202) 296-9686

Web site: <http://www.nasda.org>

Food Export USA Northeast

150 South Independence Mall, West, Suite 1036

Public Ledger Building

Philadelphia, PA 19106

Phone: (215) 829-9111

FAX: (215) 829-9777

Web site: <http://www.foodexportusa.org>

Mid-America International Agri-Trade Council

400 West Erie Street, Suite 100

Chicago, IL 60201

Phone: (312) 944-3030

FAX: (312) 944-1144

Web site: <http://www.miatco.org>

Southern United States Trade Association

#2 Canal Street, Suite 2515

New Orleans, LA 70130-1408

Phone: (504) 568-5986

FAX: (504) 568-6010

Web site: <http://www.susta.org>

Western U.S. Agricultural Trade Association

2500 Main Street, Suite 110

Vancouver, WA 98660-2697

Phone: (360) 693-3373

FAX: (360) 693-3464

Web site: <http://www.wusata.org>

## General Market Research and Market Trends

***Agricultural publications, journals, maps, micro-forms, films, videocassettes, filmstrips, slides, microcomputer software, and computerized databases***

## USDA

National Agricultural Library

10301 Baltimore Avenue

Beltsville, MD 20705

Phone: (301) 504-5479

FAX: (301) 504-6927

Web site: <http://www.nal.usda.gov>

## USDA

Agricultural Trade and Marketing Information Center

National Agricultural Library

10301 Baltimore Avenue, Room 304

Beltsville, MD 20705-2351

Phone: (301) 504-5509 or (301) 504-5414

FAX: (301) 504-5472

Web site: <http://www.nal.usda.gov/atmic>

## ***Foreign agriculture statistics and trade research***

Economic Research Service Information Center

1800 M Street, NW

Washington, DC 20036-5831

Phone: (800) 999-6779 (orders only)

Phone: (202) 694-5050

FAX: (202) 694-5700

Web site: <http://www.ers.usda.gov/>

National Agricultural Statistics Service

Research & Development Division

3251 Old Lee Highway, Room 305

Fairfax, VA 22030-1504

Ag Statistics Hotline

(800) 727-9540 or (202) 720-3879

Web site: <http://www.nass.usda.gov/research/>

## Foreign Market Information

### *General market overview*

USDA  
FAS, Trade Assistance and Promotion Office  
1400 Independence Avenue, SW  
Room 3121, South Building, or Stop 1002  
Washington, DC 20250-1052  
Phone: (202) 720-7420  
FAX: (202) 690-2489

USDA  
FAS, AgExport Services Division  
AgExport Connections  
1400 Independence Avenue, SW  
Room 4939, South Building, or Stop 1052  
Washington, DC 20250-1052  
Phone: (202) 720-7420-6343  
FAX: (202) 690-4374  
Web site:  
<http://www.fas.usda.gov/agexport/exporter.html>

### *Commodity reports*

USDA  
FAS, Dairy, Livestock, and Poultry Division  
1400 Independence Avenue, SW  
South Building, Ag Box 1044  
Washington, DC 20250-1044  
Phone: (202) 720-8031  
FAX: (202) 720-0617  
Web site: <http://www.fas.usda.gov/dlp/dlp.html>

USDA  
FAS, Forest and Fishery Products Division  
1400 Independence Avenue, SW  
Room 4647, South Building, or Stop 1047  
Washington, DC 20250-1047  
Phone: (202) 720-0638  
FAX: (202) 720-8461  
Web site: <http://www.fas.usda.gov/ffpd/fpd.html>

USDA  
FAS, Grain and Feed Division  
1400 Independence Avenue, SW  
Room 5603, South Building, or Stop 1048  
Washington, DC 20250-1048  
Phone: (202) 720-6219  
FAX: (202) 720-0340  
Web site: <http://www.fas.usda.gov/grain/default.htm>

USDA  
FAS, AgExport Services Division  
1400 Independence Avenue, SW  
Room 4939, South Building, or Stop 1052  
Washington, DC 20250-1052  
Phone: (202) 720-6343  
FAX: (202) 690-4374  
Web site:  
<http://www.fas.usda.gov/agexport/exporter.html>

USDA  
FAS, Horticultural and Tropical Products Division  
1400 Independence Avenue, SW  
Stop 1049  
Washington, DC 20250-1049  
Phone: (202) 720-6590  
FAX: (202) 720-3799  
Web site: <http://www.fas.usda.gov/htp>

USDA  
FAS, Marketing Operations Staff  
1400 Independence Avenue, SW  
Room 4932, South Building, or Stop 1042  
Washington, DC 20250-1042  
Phone: (202) 720-4327  
FAX: (202) 720-8461  
Web site: <http://www.fas.usda.gov/mos>

USDA  
FAS, Cotton, Oilseeds, Tobacco, and Seeds Division  
1400 Independence Avenue, SW  
Room 5932, South Building  
Washington, DC 20250-1000  
Phone: (202) 720-9516  
FAX: (202) 720-1171  
Web site: <http://www.fas.usda.gov/cots>

USDA  
FAS, Productions Estimates and Crop Assessment  
Division  
1400 Independence Avenue, SW  
Room 6053, South Building, or Stop 1045  
Washington, DC 20250-1045  
Phone: (202) 720-0888  
FAX: (202) 720-8880  
Web site: <http://www.fas.usda.gov/pecad>

## **Export Assistance Programs and Services**

### ***Export assistance high-value consumer food products***

USDA  
FAS, Trade Assistance and Promotion Office  
1400 Independence Avenue, SW  
Room 4939, South Building, or Stop 1052  
Washington, DC 20250-1052  
Phone: (202) 720-7420  
FAX: (202) 690-4374

### ***Information services—“AgExport Action Kit,” trade leads, buyer alert, foreign buyer lists, international trade shows***

USDA  
FAS, AgExport Services Division  
AgExport Connections  
1400 Independence Avenue, SW  
Room 4939, South Building, or Stop 1052  
Washington, DC 20250-1052  
Phone: (202) 720-7420  
FAX: (202) 690-4374  
Web site:  
<http://www.fas.usda.gov/agexport/exporter.html>

### ***Commodity marketing programs***

USDA  
FAS, Dairy, Livestock, and Poultry Division  
1400 Independence Avenue, SW  
Room 5935, South Building, or Stop 1044  
Washington, DC 20250-1044  
Phone: (202) 720-8031  
FAX: (202) 720-0617  
Web site: <http://www.fas.usda.gov/dlp/dlp.html>

USDA  
FAS, Forest and Fishery Products Division  
1400 Independence Avenue, SW  
Room 4647, South Building, or Stop 1047  
Washington, DC 20250-1047  
Phone: (202) 720-0638  
FAX: (202) 720-8461  
Web site: <http://www.fas.usda.gov/ffpd/fpd.html>

USDA  
FAS, Grain and Feed Division  
1400 Independence Avenue, SW  
Room 5603, South Building, or Stop 1048  
Washington, DC 20250-1048  
Phone: (202) 720-6219  
FAX: (202) 720-0340

USDA  
FAS, AgExport Services Division  
1400 Independence Avenue, SW  
Room 4939, South Building, or Stop 1052  
Washington, DC 20250-1052  
Phone: (202) 720-7402  
FAX: (202) 690-4374  
Web site:  
<http://www.fas.usda.gov/agexport/exporter.html>

USDA  
FAS, Horticultural and Tropical Products Division  
1400 Independence Avenue, SW  
Stop 1049  
Washington, DC 20250-1049  
Phone: (202) 720-6590  
FAX: (202) 720-3799  
Web site: <http://www.fas.usda.gov/htp/>

USDA  
FAS, Marketing Operations Staff  
1400 Independence Avenue, SW  
Room 4932, South Building, or Stop 1042  
Washington, DC 20250-1042  
Phone: (202) 720-4327  
FAX: (202) 720-8461  
Web site: <http://www.fas.usda.gov/mos/>

USDA  
FAS, Cotton, Oilseeds, Tobacco, and Seeds Division  
1400 Independence Avenue, SW  
Room 5932, South Building  
Washington, DC 20250-1000  
Phone: (202) 720-9516  
FAX: (202) 720-0965  
Web site: <http://www.fas.usda.gov/cots/>

USDA  
FAS, Productions Estimates and  
Crop Assessment Division  
1400 Independence Avenue, SW  
Room 6053, South Building, or Stop 1045  
Washington, DC 20250-1045  
Phone: (202) 720-0888  
FAX: (202) 720-8880  
Web site: <http://www.fas.usda.gov/pecad/>

## Foreign Country Import Requirements

***Plant import requirements—EXCERPT (includes endangered and threatened plants protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES))***

EXCERPT subscription  
Purdue University  
CERIS/EXCERPT  
1231 Cumberland Avenue, Suite A  
West Lafayette, IN 47906-1317  
Phone: (765) 494-6616  
FAX: (765) 494-9727  
Web site: <http://www.ceris.purdue.edu/index.html>

USDA  
APHIS, Export Certification Unit  
4700 River Road, Unit 139  
Riverdale, MD 20737  
Phone: (301) 734-8537  
FAX: (301) 734-5786  
Web site: <http://www.aphis.usda.gov/export/>

APHIS  
State plant health directors' offices and agricultural quarantine inspection port centers organized by States.

### Alaska

State Plant Health Director  
P.O. Box 190191  
Anchorage, AK 99519  
Phone: (907) 271-1239  
FAX: (907) 271-1241

### Alabama

State Plant Health Director  
4121 Carmichael Road, Suite 203  
Montgomery, AL 36106  
Phone: (334) 396-9464  
FAX: (334) 396-5767

Port of Mobile  
Port Director  
Alabama State Docks  
Building 52  
Mobile, AL 36603  
Phone: (334) 441-6158  
FAX: (334) 441-6181

### Arkansas

State Plant Health Director  
1200 Cherrybrook Drive, Suite 100  
Little Rock, AR 72211-3861  
Phone: (501) 324-5258  
FAX: (501) 225-5823

### Arizona

State Plant Health Director  
3658 East Chipman Road  
Phoenix, AZ 85040  
Phone: (602) 431-8930  
FAX: (602) 438-0877

### California

State Plant Health Director  
9505 Micron Avenue, Suite G  
Sacramento, CA 95827  
Phone: (916) 857-6241  
FAX: (916) 857-6248

Port of Calexico  
Port Director  
Calexico East Border Station  
1699 East Carr Road  
P.O. Box 2940  
Calexico, CA 92231  
Phone: (760) 768-2540  
FAX: (760)-2546

Port of Long Beach  
Port Director  
11 Golden Shore, Suite 460  
Long Beach, CA 90802  
Phone: (562) 980-4227  
FAX: (562) 980-4208

Port of Los Angeles  
Port Director  
9610 South La Cienega Boulevard  
Inglewood, CA 90301  
Phone: (310) 215-2598  
FAX: (310) 215-2054

Port of Sacramento  
Port Director  
9550 Micron Avenue, Suite F  
Sacramento, CA 95827  
Phone: (916) 857-6258  
FAX: (916) 857-6266

Port of San Diego/San Ysidro  
Port Director  
720 East San Ysidro Boulevard, Room 2114  
U.S. Border Station  
San Ysidro, CA 92173  
Phone: (619) 662-7333  
FAX: (619) 662-7335

Port of San Francisco  
Port Director  
389 Oyster Point Boulevard, Suite 2  
South San Francisco, CA 94080  
Phone: (650) 876-9095  
FAX: (650) 876-0915

Port of Oakland  
Port Director  
Federal Building North  
1301 Clay Street, Suite 160 N  
Oakland, CA 94612  
Phone: (510) 637-2987  
FAX: (510) 637-3780

#### Central Region

Regional Office: Brownsville, TX  
Regional Director  
3505 Boca Chica Boulevard, Suite 360  
Brownsville, TX 78521-4065

#### Connecticut

State Plant Health Director  
900 Northrup Road, Suite C  
Wallingford, CT 06492-1900  
Phone: (203) 269-4277  
FAX: (203) 284-9031

#### Delaware

State Plant Health Director  
300 South New Street, Suite 1107  
Dover, DE 19904-6726  
Phone: (302) 678-5868  
FAX: (302) 734-7814

#### Florida

State Plant Health Director  
7022 Northwest 10th Place  
Gainesville, FL 32605-3147  
Phone: (352) 331-3990  
FAX: (352) 331-0804

Port of Fort Pierce  
Port Director  
St. Lucie International Airport  
2994 Aviation Way  
Fort Pierce, FL 34946  
Phone: (561) 464-1038  
FAX: (561) 466-1126

Port of Tampa  
Port Director  
4951-B East Adamo Drive, Suite 220  
Tampa, FL 33605  
Phone: (813) 228-2172  
FAX: (813) 228-2441

Port of Fort Lauderdale  
Port Director  
1800 Eller Drive  
World Trade Center, Suite 110  
Fort Lauderdale, FL 33316  
Phone: (954) 356-7252  
FAX: (954) 763-3929

Port of Jacksonville  
Port Director  
4080 Woodcock Drive, Suite 109  
Jacksonville, FL 32207  
Phone: (904) 396-2363  
FAX: (904) 396-1741

Port of Orlando  
Port Director  
9317 Tradeport Drive  
Plant Inspection  
Orlando, FL 32501  
Phone: (407) 648-6856  
FAX: (407) 648-6859

Port of Miami  
Port Director  
5600 Northwest 36th Street, Suite 560  
Miami Springs, FL 3126  
Phone: (305) 526-2926  
FAX: (305) 526-7266

#### Georgia

State Plant Health Director  
1498 Klondike Road, Suite 200  
Conyers, GA 30094  
Phone: (770) 922-9894  
FAX: (770) 922-4079



Port of Atlanta  
Port Director  
Hartsfield International Airport FIS  
Concourse-E  
12700 Spine Road  
Atlanta, GA 30320  
Phone: (404) 763-7716  
FAX: (404) 763-7108

Port of Savannah  
Port Director  
120 Bernard Street, Room A-311  
Savannah, GA 31401-3647  
Phone: (912) 652-4366  
FAX: (912) 652-4086

#### Guam

Port of Agana  
Port Director  
P.O. Box 8769  
Tamuning, Guam 96931-6030  
Phone: (671) 647-6030  
FAX: (671) 647-6029

#### Hawaii

State Plant Health Director  
Prince Jonah Kuhio Kalaniana'ole Federal Building  
Room 8-152  
300 Ala Moana Boulevard  
P.O. Box 50002  
Honolulu, HI 96850  
Phone: (808) 541-1980, 1981  
FAX: (808) 541-1978

Port of Honolulu  
Port Director  
Honolulu International Airport  
300 Rodgers Boulevard, #57  
Honolulu, HI 96819-1897  
Phone: (808) 861-8492/8493  
FAX: (808) 861-8499

Port of Hilo  
Port Director  
Hilo International Airport  
Hilo, HI 96720  
Phone: (808) 933-6930/6931  
FAX: (808) 933-6932

Port of Kahului  
Port Director  
Kahului Airport  
Box 11  
Kahului, HI 96732  
Phone: (808) 877-8757  
FAX: (808) 877-9086

Port of Kailua-Kona  
Port Director  
Kona International Airport  
USDA, APHIS, PPQ  
73-300 Kupipi Street  
Kailua-Kona, HI 96740-2646  
Phone: (808) 326-1252  
FAX: (808) 329-3756

Port of Lihue  
Port Director  
3901 Mokulele Loop, Unit 11  
Lihue, HI 96766-9706  
Phone: (808) 245-2977, 2831  
FAX: (808) 246-9464

#### Iowa

State Plant Health Director  
6000 Fleur Drive  
Des Moines, IA 50321-2871  
Phone: (515) 285-7044  
FAX: (515) 285-7524

#### Idaho

State Plant Health Director  
9134 West Blackeagle Drive  
Boise, ID 83709  
Phone: (208) 378-5797  
FAX: (208) 378-5794

#### Illinois

State Plant Health Director  
2400 East Devon Street, Suite 265  
Des Plaines, IL 60018-4617  
Phone: (847) 299-0024, 6939  
FAX: (847) 299-6046

Port of Chicago  
Port Director  
O'Hare International Airport  
O'Hare International Arrivals Building  
Terminal 5  
P.O. Box 66192  
Chicago, IL 60666-0192  
Phone: (773) 894-2920  
FAX: (773) 894-2927

#### Indiana

State Plant Health Director  
120 Professional Court, Suite D  
Lafayette, IN 47905  
Phone: (765) 446-0267/1263  
FAX: (765) 446-8274

#### Kansas

State Plant Health Director  
1947 Northwest Topeka Boulevard  
Topeka, KS 66608  
Phone: (785) 235-0212  
FAX: (785) 235-1464

#### Kentucky

State Plant Health Director  
12921 West Highway 42  
Prospect, KY 40059  
Phone: (502) 228-8224  
FAX: (502) 228-6306

Cincinnati International Airport  
Port Director  
P.O. Box 18402  
Erlanger, KY 41018  
Phone: (606) 767-7070  
FAX: (606) 767-7074

#### Louisiana

State Plant Health Director  
4354 S. Sherwood Forest Boulevard  
Suite 150  
Baton Rouge, LA 70816  
Phone: (225) 298-5410  
FAX: (225) 298-5415

Port of New Orleans  
Port Director  
U.S. Customhouse  
423 Canal Street, Room 148  
New Orleans, LA 70130  
Phone: (504) 589-6731  
FAX: (504) 589-4111

#### Massachusetts

State Plant Health Director  
10 Causeway Street  
Thomas P. O'Neill Building, Suite 518  
Boston, MA 02222-1088  
Phone: (617) 565-7030  
FAX: (617) 565-6933

Port of Boston  
Port Director  
Logan International Airport  
Terminal E  
Easton Boston, MA 02128  
Phone: (617) 568-1481  
FAX: (617) 561-5917

#### Maryland

State Plant Health Director  
Wayne A. Cawley, Jr., Building, Room 350  
50 Harry S Truman Parkway  
Annapolis, MD 21401-7080  
Phone: (410) 224-3452, 3495  
FAX: (410) 224-1142

Port of Baltimore  
Port Director  
2200 Broening Highway, Suite 140  
Baltimore, MD 21224-6623  
Phone: (410) 631-0075  
FAX: (410) 631-0083

#### Maine

State Plant Health Director  
267-B Godfrey Boulevard  
International Arrivals Building  
Bangor, ME 04401-3025  
Phone: (207) 945-0479  
FAX: (207) 942-6177

## Michigan

State Plant Health Director  
International Terminal, Room 228  
Metropolitan Airport  
Detroit, MI 48242  
Phone: (313) 942-9005  
FAX: (313) 942-7691

Port of Detroit  
Port Director  
Operation Office  
International Terminal  
Metropolitan Airport  
Detroit MI 48242  
Phone: (734) 942-7024/7035  
FAX: (734) 942-7409

Port Huron  
Port Director  
2321 Pine Grove Avenue, Suite 100  
Port Huron, MI 48060-1306  
Phone: (810) 985-6126  
FAX: (810) 985-5542

## Minnesota

State Plant Health Director  
P.O. Box 18  
St. Paul, MN 55111  
Phone: (612) 725-1722  
FAX: (612) 725-1723

Port of Minneapolis/St. Paul  
Minneapolis/St. Paul International Airport  
P.O. Box 11690  
Saint Paul, MN 55111-1690  
Phone: (612) 725-0078  
FAX: (612) 727-2442

## Montana

State Plant Health Director  
Plaza Office Building A  
1629 Avenue D, Suite 5  
Billings, MT 59102  
Phone: (406) 657-6282/6283  
FAX: (406) 657-6293

## North Carolina

State Plant Health Director  
1017 Main Campus Drive, Suite 2500  
Raleigh, NC 27606-5202  
Telephone: (919) 513-4479  
FAX: (919) 513-4542

Port of Charlotte  
Port Director  
1901-A Cross Beam Drive  
Charlotte, NC 28217  
Phone: (704) 357-1275  
FAX: (704) 357-1326

Port of Wilmington  
Port Director  
P.O. Box 9002  
Wilmington, NC 28402  
Phone: (910) 815-4667  
FAX: (910) 815-4545

## North Dakota

State Plant Health Director  
2301 University Drive, Building 23 B  
Bismark, ND 58504-7595  
Phone: (701) 250-4473  
FAX: (701) 250-4640

## Nebraska

State Plant Health Director  
5940 South 58th Street  
P.O. Box 81866  
Lincoln, NE 68501  
Phone: (402) 434-2345  
FAX: (402) 434-2330

## New Hampshire

State Plant Health Director  
175 Ammon Drive  
Manchester, NH 03103-7414  
Phone: (603) 666-7445  
FAX: (603) 644-2689

## New Jersey

State Plant Health Director  
320 Corporate Park  
Robbinsville, NJ 08691  
Phone: (609) 259-8649  
FAX: (609) 259-8651

Port of Elizabeth  
Port Director  
1201 Corbin Street  
Elizabeth, NJ 07201-2943  
Phone: (973) 645-2985  
FAX: (973) 645-6023

Newark International Airport  
Assistant Port Director  
Terminal B  
International Arrivals Area  
Newark, NJ 07114  
Phone: (973) 645-3775  
FAX: (973) 645-6389

## New Mexico

State Plant Health Director  
6200 Jefferson Street, NE  
Suite 130  
Albuquerque, NM 87109-3434  
Phone: (505) 761-3189  
FAX: (505) 761-3197

## Nevada

State Plant Health Director  
1550 South Wells Avenue, Room 204  
Reno, NV 89502  
Phone: (702) 784-5701/5702  
FAX: (702) 784-5468

## New York

State Plant Health Director  
1 Winner's Circle, Suite 203  
Albany, NY 12205  
Phone: (518) 438-3896  
FAX: (518) 438-7675

Port of New York  
Port Director  
J.F. Kennedy International Airport  
Passenger Clearance Operations  
Terminal 4W, Room 117.026  
Jamaica, New York 11430  
Phone: (718) 553-1661/1662  
FAX: (718) 553-0244

Port of Brooklyn  
Port Director  
850 3d Avenue  
Federal Building, 1st Floor  
Brooklyn, NY 11232-1520  
Phone: (718) 340-5225, 5226  
FAX: (718) 340-5224

Port of Buffalo  
Port Director  
783 Busti Avenue, 1st Floor  
Buffalo, NY 14213-2405  
Phone: (716) 551-3828  
FAX: (716) 551-3976

## Ohio

State Plant Health Director  
12927 Stonecreek Drive, NW  
Pickerington, OH 43147-8424  
Phone: (614) 469-2110  
FAX: (614) 469-6733

## Oklahoma

State Plant Health Director  
4020 North Lincoln Boulevard, Suite 101  
Oklahoma City, OK 73105  
Phone: (405) 427-9438  
FAX: (405) 427-9451

## Oregon

State Plant Health Director  
Airport Business Center  
6135 Northeast 80th Avenue, Suite A-5  
Portland, OR 97218-4033  
Phone: (503) 326-2814  
FAX: (503) 326-2969

Port of Portland  
Port Director  
Airport Business Center  
6135 Northeast 80th Avenue, Suite A-5  
Portland, OR 97218-4033  
Phone: (503) 326-2814  
FAX: (503) 326-2969

#### Pennsylvania

State Plant Health Director  
401 East Louther Street, Suite 102  
Carlisle, PA 17013  
Phone: (717) 241-2465 or (717) 241-0705 (Plum Pox)  
FAX: (717) 241-0718

Port of Philadelphia  
Port Director  
Custom House, Rooms 1004 & 1007  
2d & Chestnut Streets  
Philadelphia, PA 19106-2910  
Phone: (215) 597-4515  
FAX: (215) 597-7039

#### Puerto Rico

State Plant Health Director  
GSA Center  
651 Federal Drive, Suite 321-16  
Guaynabo, PR 00965  
Phone: (787) 749-4469  
FAX: (787) 749-4473

Port of Mayaguez  
80 Carr 3341, Suite 104  
Mayaguez, PR 00680  
Phone: (787) 831-3322  
FAX: (787) 831-3314

Luis Munoz Marin  
International Airport  
Port Director  
P.O. Box 37521  
San Juan, PR 00937  
Phone: (787) 253-7851  
FAX: (787) 253-4514

#### Rhode Island

State Plant Health Director  
40 Quaker Lane, Room 45  
Warwick, RI 02886-0111  
Phone: (401) 828-9025  
FAX: (401) 826-3330

#### South Carolina

State Plant Health Director  
9600 Two Notch Road, Suite 10  
Columbia, SC 29223  
Phone: (803) 788-0506  
FAX: (803) 788-1915

Port of Charleston  
Port Director  
334 Meeting Street  
Federal Building, Room 513  
Charleston, SC 29403  
Phone: (843) 727-4521  
FAX: (843) 727-4111

#### South Dakota

State Plant Health Director  
P.O. Box 250  
Pierre, SD 57501  
Phone: (605) 224-1713  
FAX: (605) 224-0172

#### Tennessee

State Plant Health Director  
322 Knapp Boulevard, Suite 101  
Nashville, TN 37217  
Phone: (615) 781-5477  
FAX: (615) 399-3026

Port of Memphis  
Port Director  
Allen O'Hara Building  
3385 Airways Boulevard, Suite 217  
Memphis, TN 38116  
Phone: (901) 544-4212  
FAX: (901) 346-2766

Texas

State Plant Health Director  
903 San Jacinto Boulevard, Suite 270  
Room A-151  
Austin, TX 78701-2450  
Phone: (512) 916-5241  
FAX: (512) 916-5243

Port of Brownsville  
Port Director  
Border Service Building  
3300 South Expressway 77/83  
Room A-151  
Brownsville, TX 78521  
Phone: (956) 983-5800  
FAX: (956) 983-5830

Port of Dallas/Fort Worth  
Port Director  
2E, AA Terminal  
Level 3, FIS DFW Airport  
Room 19324, P.O. Box 610063  
DFW Airport, TX 75261  
Phone: (972) 574-2116  
FAX: (972) 574-2024

Port of Eagle Pass  
U.S. Border Station, Room 101  
160 Garrison Street  
Eagle Pass, TX 78852  
Phone: (830) 773-3726  
FAX: (830) 773-0450

Port of El Paso  
Port Director  
Cordova Border Station  
3600 East Paisano, Room 154-A  
El Paso, TX 79905  
Phone: (915) 872-4720,4722  
FAX: (915) 872-4738

Port of Galveston  
Port Director  
601 Rosenberg Street, Room 402  
P.O. Box 266  
Galveston, TX 7753  
Phone: (409) 766-3634  
FAX: (409) 766-3654

Port of Harlingen  
Port Director  
213 South H Street  
P.O. Box 531539  
Harlingen, TX 78553-1539  
Phone: (956) 427-8527  
FAX: (956) 427-8528

Port of Pharr  
Port Director  
Pharr International Bridge  
9901 South Cage Street, Suite A  
Pharr, TX 78577  
Phone: (956) 783-5052  
FAX: (956) 783-5387

Port of Houston  
Port Director  
8799 North Loop, East, Suite 240  
Houston, TX 77029  
Phone: (713) 671-7783  
FAX: (713) 671-7789

Port of Laredo  
Port Director  
New Border Station, Room 505  
Lincoln-Juarez Bridge, Building 5  
P.O. Box 277  
Laredo, TX 78042-0277  
Phone: (956) 726-2225  
FAX: (956) 726-2322

Port of San Antonio  
Port Director  
9800 Airport Boulevard, Suite 1108  
San Antonio, TX 78216  
Phone: (210) 472-5060  
FAX: (210) 472-5062  
Phone: (210) 726-2225  
FAX: (210) 726-2322

\*El Paso and Eagle Pass

Contact Point Officer  
P.O. Box 1497  
Santa Teresa, NM 88008  
Phone: (505) 589-2355  
FAX: (505) 589-0332

\*Houston, Galveston, Dallas, and TDA Gulf Coast  
Regional Office Houston, TX

Contact Point Officer  
1717 E. Loop, 610 N. Suite 140  
Houston, TX 77029  
Phone: (713) 653-3131  
FAX: (713) 671-0601

#### Utah

State Plant Health Director  
1860 West Alexander, Suite B  
West Valley, UT 84119  
Phone: (801) 975-3310/3311  
FAX: (801) 975-3313

#### Virginia

State Plant Health Director  
2702 Charles City Road  
Richmond, VA 23231-4536  
Phone: (804) 771-2042  
FAX: (804) 771-2477

Port of Norfolk  
Port Director  
200 Granby Mall  
Federal Building, Room 331  
Norfolk, VA 23510-1811  
Phone: (757) 441-3211  
FAX: (757) 441-6267

Dulles International Airport  
Port Director  
P.O. Box 17134  
Washington, DC 20041-0134  
Phone: (703) 661-8263  
FAX: (703) 661-8165

#### Virgin Islands

Port of St. Thomas  
Port Director  
Federal Building  
Room 141  
Veterans Drive  
Charlotte Amalie  
St. Thomas, VI 00801  
Phone: (340) 776-2787  
FAX: (340) 774-0796

Port of St. Croix  
Port Director  
Henry E. Rohlsen Airport  
Terminal Building  
St. Croix, VI 00851  
Phone: (340) 778-1696  
FAX: (340) 778-0197

#### Vermont

State Plant Health Director  
617 Comstock Road, Suite 3  
Berlin, VT 05602-8927  
Phone: (802) 828-4490  
FAX: (802) 828-4591

#### Washington

State Plant Health Director  
22000 Marine View Drive, South, Suite 201  
Des Moines, WA 98198  
Phone: (206) 592-9057  
FAX: (206) 592-9043

Port of Seattle-Air  
Port Director  
Sea-Tac International Airport  
16215 Air Cargo Road, Suite 114  
Seattle, WA 98158-1301  
Phone: (206) 246-6789  
FAX: (206) 246-6661

Port of Seattle-Maritime  
Port Director  
7 South Nevada Street, Suite 300  
Seattle, WA 98134  
Phone: (206) 553-2400  
FAX: (206) 553-2418

Port of Blaine  
Port Director  
P.O. Box 1930  
Blaine, WA 98231-1930  
Phone: (360) 332-8891  
FAX: (360) 332-7830

Port of Spokane  
Port Director  
Spokane County Agricultural Building  
North 222 Havana, Room 109  
Spokane, WA 99202  
P.O. Box 4509 (Mail)  
Spokane, WA 99202-0509  
Phone: (509) 353-2950  
FAX: (509) 353-2637

#### Western Region

Regional Office: Sacramento, CA  
Regional Director  
9580 Micron Avenue, Suite 1  
Sacramento, CA 95827  
Phone: (916) 857-6065  
FAX: (916) 6156

#### Wisconsin

State Plant Health Director  
1 Gifford Pinchot Drive  
Building 1, Room 204  
Madison, WI 53705-2366  
Phone: (608) 264-5112  
FAX: (608) 264-5096

Port of Milwaukee  
Port Director  
201 Air Cargo Way  
Milwaukee, WI 53207  
Phone: (414) 481-7560  
FAX: (414) 744-6662

#### West Virginia

State Plant Health Director  
Route 1, Box 142  
Ripley, WV 25271-9724  
Telephone: (304) 372-8590  
FAX: (304) 372-8592

#### Wyoming

State Plant Health Director  
504 West 17th Street, Suite 200  
Cheyenne, WY 82001-4348  
Phone: (307) 772-2323  
FAX: (307) 772-2780

#### ***Animal health requirements***

USDA  
APHIS, Veterinary Services  
National Center for Import and Export  
4700 River Road, Unit 40  
Riverdale, MD 20737  
Phone: (301) 734-3294  
FAX: (301) 734-6402  
Web site:  
[http://www.aphis.usda.gov/vs/import\\_export.htm](http://www.aphis.usda.gov/vs/import_export.htm)

#### ***Meat and poultry foreign import requirements***

USDA  
FSIS, International Programs  
Export Coordination Division  
1400 Independence Avenue, SW  
Room 0114, South Building  
Washington, DC 20250  
Phone: (202) 501-6022  
FAX: (202) 501-6929  
Web site:  
<http://www.fsis.usda.gov/OA/programs/import.htm>

#### ***Foreign import technical requirements-food additives, labels, pesticide residues, and food sanitation***

USDA  
FAS, International Trade Policy  
Office of Food Safety and Technical Services  
1400 Independence Avenue, SW  
Room 5545, South Building  
Washington, DC 20550-1000  
Phone: (202) 720-1301  
FAX: (202) 690-0677  
Web site: <http://www.fas.usda.gov/itp/ofsts/ofsts.html>

#### ***Seafood and aquaculture***

U.S. Department of Commerce  
Inspection Services Division  
National Marine Fisheries Service (NMFS)  
1315 East-West Highway  
Silver Spring, MD 20910  
Phone: (301) 713-2355  
FAX: (301) 713-1081  
Web site: <http://seafood.nmfs.noaa.gov>



### ***Foreign tariff rates and import quotas***

USDA  
FAS, International Trade Policy  
Europe, Africa, and Middle East Division  
1400 Independence Avenue, SW  
Room 5514, South Building, or Stop 1024  
Washington, DC 20250  
Phone: (202) 720-1340  
FAX: (202) 690-2079

USDA  
FAS, International Trade Policy  
Asia Americas Division  
1400 Independence Avenue, SW  
Room 5509, South Building, or Stop 1023  
Washington, DC 20250  
Phone: (202) 720-1289  
FAX: (202) 690-1093

### **U.S. Export Requirements**

#### ***Export Apple Act and Export Grape and Plum Act***

USDA  
Fruit and Vegetable Programs  
USDA, Agricultural Marketing Service  
1400 Independence Avenue, SW  
Room 2077, South Building  
Washington, DC 20090-0235  
Phone: (202) 720-5053  
FAX: (202) 720-5698  
Web site: <http://www.ams.usda.gov/fv/>

USDA  
Fruit and Vegetable Programs  
1220 Southwest Third Avenue, Room 369  
Portland, OR 97204  
Phone: (503) 326-2724  
FAX: (503) 326-7440

USDA  
Fruit and Vegetable Programs  
2202 Monterey Street, Suite 102A  
Fresno, CA 93721-3175  
Phone: (599) 487-5210  
FAX: (599) 485-5914

### ***Export regulations for alcoholic beverages***

U.S. Department of the Treasury  
Bureau of Alcohol, Tobacco, and Firearms  
Alcohol Import/Export Branch  
Room 5200  
650 Massachusetts Avenue, NW  
Washington, DC 20226  
Phone: (202) 927-8110  
FAX: (202) 927-8605  
Web site: <http://www.atf.treas.gov/>

### ***U.S. trade embargoes or restrictions for a given country***

U.S. Department of the Treasury  
Office of Foreign Assets Control  
1500 Pennsylvania Avenue, NW  
Washington, DC 20220  
Phone: (202) 622-2500  
FAX: (202) 622-1657  
Web site: <http://www.ustreas.gov/ofac>

### ***Export licensing and antiboycott compliance***

U.S. Department of Commerce  
Bureau of Export Administration  
Export Licensing, Room 1099  
14th & Constitution Avenue, NW  
Washington, DC 20233  
Phone: (202) 482-4811  
Office of Antiboycott Compliance, Room 6098  
Phone: (202) 482-2381 or 0913  
Web site: <http://www.bxa.doc.gov>

### ***Export permit for CITES listed plants***

USDA  
APHIS, Plant Protection and Quarantine  
Permit Unit  
4700 River Road, Unit 40  
Riverdale, MD 20737-1231  
Phone: (301) 734-3294  
FAX: (301) 734-6402  
Web site: <http://www.aphis.usda.gov/ppq/>

### ***Export permit for CITES listed plants and animals***

U.S. Department of the Interior  
U.S. Fish and Wildlife Service  
Office of Management Authority  
4401 North Fairfax Drive, Room 700  
Arlington, VA 22203  
Phone: (800) 358-2104  
FAX: (703) 358-2281  
Web site: <http://www.fws.gov>

### **U.S. Export Inspection, Grading, and Certification**

#### ***Grade and quality certification***

USDA  
AMS, Dairy Programs  
Dairy Grading Branch  
1400 Independence Avenue, SW  
Room 2750, South Building  
Washington, DC 20250-6456  
Phone: (202) 720-3171  
FAX: (202) 720- 2643  
Web site: <http://www.ams.usda.gov/dairy/>

USDA  
AMS, Fruit and Vegetable Programs  
Fresh Products Branch  
1400 Independence Avenue, SW  
Room 2049, South Building  
Washington, DC 20250-6456  
Phone: (202) 720-5870  
FAX: (202) 720-0393  
Web site: <http://www.ams.usda.gov/fv/>

USDA  
AMS, Fruit and Vegetable Programs  
Processed Products Branch  
1400 Independence Avenue, SW  
Room 0709, South Building  
Washington, DC 20250-0247  
Phone: (202) 720-4693  
FAX: (202) 690-1087  
Web site: <http://www.ams.usda.gov/fv/>

USDA  
AMS, Livestock and Seed Programs  
Meat Grading and Certification Branch  
1400 Independence Avenue, SW  
Room 2628, South Building  
Washington, DC 20250-6456  
Phone: (202) 720-1246  
FAX: (202) 690-4119  
Web site: <http://www.ams.usda.gov/lsg/>

USDA  
AMS, Poultry Programs  
Poultry Grading Branch  
1400 Independence Avenue, SW  
Room 3938, South Building  
Washington, DC 20250-6456  
Phone: (202) 720-3271  
FAX: (202) 690-3165  
Web site: <http://www.ams.usda.gov/poultry/>

USDA  
AMS, Science and Technology Programs  
Technical Services Branch  
Room 3519, South Building  
Box 96456  
Washington, DC 20090-6456  
Phone: (202) 690-0621  
FAX: (202) 720-6496  
Web site: <http://www.ams.usda.gov/science/>

USDA  
AMS, Transportation and Marketing Programs  
National Organic Program  
1400 Independence Avenue, SW  
Room 4008, South Building  
Washington, DC 20250  
Phone: (202) 720-3252  
FAX: (202) 690-3924  
Web site: <http://www.ams.usda.gov/nop/>

#### ***Seafood and aquaculture***

U.S. Department of Commerce  
National Marine Fisheries Service (NMFS)  
Inspection Services Programs  
1315 East-West Highway  
Silver Spring, MD 20910  
Phone: (301) 713-2355  
FAX: (301) 713-1081  
Web site: <http://seafood.nmfs.noaa.gov>

## ***Inspection certificates***

### ***Phytosanitary—plants and plant products.***

For information on obtaining phytosanitary certificates, contact the Export Certification Unit listed below, the APHIS contact point officer nearest you (listed in Foreign Country Import Requirements section), your State department of agriculture, or your local county agricultural commissioner's office.

USDA  
APHIS, Plant Protection and Quarantine  
Export Certification Unit  
4700 River Road, Unit 139  
Riverdale, MD 20737-1228  
Phone: (301) 734-8537  
FAX: (301) 734-5786  
Web site: <http://www.aphis.usda.gov/ppq/>  
<http://www.aphis.usda.gov/ppq/pim/exports/>

### ***Live animals***

USDA  
APHIS, Veterinary Services  
National Center for Import and Export  
4700 River Road, Unit 148  
Riverdale, MD 20737-123  
Phone: (301) 734-8364  
FAX: (301) 734-6402  
Web site: <http://www.aphis.usda.gov/vs/ncie/>

### ***Veterinary biological products—Vaccines, bacterins, antiserums, diagnostics, toxoids, immunostimulants, etc.***

USDA  
APHIS, CVBLPD  
4700 River Road, Unit 148  
Riverdale, MD 20737  
Phone: (301) 734-8245  
FAX: (301) 734-8910  
Web site: <http://www.aphis.usda.gov/vs/cvb/>

### ***Grain***

USDA  
Federal Grain Inspection Service  
Room 1627, South Building  
P.O. Box 96454  
Washington, DC 20090-6454  
Phone: (202) 720-0226  
FAX: (202) 720-1015  
Web site: <http://www.usda.gov/gipsa/>

## ***Meat and poultry products***

USDA  
FSIS, International Programs  
Export Coordination Division  
1400 Independence Avenue, SW  
Room 0114, South Building  
Washington, DC 20250  
Phone: (202) 501-6022  
FAX: (202) 501-6929

USDA  
FSIS, Export Coordination Division  
1400 Independence Avenue, SW  
Room 0019, South Building  
Washington, DC 20250  
Phone: (202) 720-9051  
FAX: (202) 690-3856  
Web site:  
<http://www.fsis.usda.gov/OFO/export/explib.htm>

### ***Honey, equine products, fresh pork, poultry, butter, dry whole milk, butteroil, oilseed, and soybeans***

USDA  
AMS, Science and Technology Programs  
Technical Services Branch  
Room 3519, South Building  
Box 96456  
Washington, DC 20090-6456  
Phone: (202) 690-0621  
FAX: (202) 720-6496  
Web site: <http://www.ams.usda.gov/science>

### ***Aquatic animal health***

USDA  
APHIS, Veterinary Services  
National Animal Health Program  
4700 River Road, Unit 43  
Riverdale, MD 20737  
Phone: (301) 734-4914 or -4363  
FAX: (301) 734-7964  
Web site:  
<http://www.aphis.usda.gov/vs/aqua/aquaphis.html>

### **Seafood and aquaculture**

U.S. Department of Commerce  
National Marine Fisheries Service (NMFS)  
Inspection Services Division  
1315 East-West Highway  
Silver Spring, MD 20910  
Phone: (301) 713-2355  
FAX: (301) 713-1081  
Web site: <http://seafood.nmfs.noaa.gov>

**Food and Drug Administration (FDA) Issued Export Certificates—FDA accepts requests for export certificates in writing only.**

#### **Seafood**

U.S. Food and Drug Administration  
Center for Food Safety and Applied Nutrition  
Office of Seafood, HFS-400  
200 C Street, SW  
Washington, DC 20204  
Web site: <http://www.cfsan.fda.gov/seafood1.html>

#### **Cosmetics**

U.S. Food and Drug Administration  
Center for Food Safety and Applied Nutrition  
Office of Cosmetics and Colors, HFS-100  
200 C Street, SW  
Washington, DC 20204  
Web site: <http://www.cfsan.fda.gov/~dms/cos-toc.html>

#### **Food grade chemicals and food additives**

U.S. Food and Drug Administration  
Center for Food Safety and Applied Nutrition  
Office of Premarket Approval, HFS-200  
200 C Street, SW  
Washington, DC 20204  
Web site: <http://www.cfsan.fda.gov/~lrd/foodadd.html>

#### **Standardized and related foods excluding seafood**

U.S. Food and Drug Administration  
Center for Food Safety and Applied Nutrition  
Office of Plant and Dairy Foods and Beverages,  
HFS-300  
200 C Street, SW  
Washington, DC 20204  
Web site: <http://vm.cfsan.fda.gov/list.html>

### **Dietary supplements, vitamins, minerals, herbal preparations, infant formulas, and medical foods**

U.S. Food and Drug Administration  
Center for Food Safety and Applied Nutrition  
Office of Special Nutritionals, HFS-800  
200 C Street, SW  
Washington, DC 20204  
Web site: <http://www.cfsan.fda.gov/~dms/supplmnt.html>

#### **Veterinary products—Animal drugs, feeds, feed additives, etc.**

U.S. Food and Drug Administration  
Center for Veterinary Medicine, Office of Compliance  
7500 Standish Place  
Rockville, MD 20855  
Phone: (301) 594-1785  
Voice-mail: (301) 827-0153  
FAX: (301) 594-1812  
Web site: <http://www.fda.gov/cvm/default.htm>

#### **Export Transportation**

#### **Agricultural export transportation information—general “how to transport” information, educational programs, market news, regulatory representation, and special reports**

USDA  
AMS, Transportation and Marketing Programs  
Transportation Services Branch  
1400 Independence Avenue, SW  
Room 1203, South Building, or Stop 0266  
Washington, DC 20250-0266  
Phone: (202) 690-1304  
FAX: (202) 690-1340  
Web site: <http://www.ams.usda.gov/tmd/tmdsea.htm>

#### **Ocean liner carrier regulation, both American and foreign**

Federal Maritime Commission  
Bureau of Tariffs, Certification, and Licensing  
800 North Capitol, Street NW  
Washington, DC 20573  
Phone: (202) 523-5796  
FAX: (202) 523-5830  
Web site: <http://www.fmc.gov>

Federal Maritime Commission  
Office of Freight Forwarders  
800 North Capitol Street, NW  
Washington, DC 20573  
Phone: (202) 523-5843  
FAX: (202) 523-5830  
Web site: <http://www.fmc.gov>

### **Export Financing and Insurance**

***Agricultural export credits—Export Credit Guarantee Program (GSM-102), Intermediate Export Credit Guarantee Program (GSM-103), Supplier Credit Guarantee Program (SCGP), Facility Guarantee Program (FGP), Export Enhancement Program (EEP), Dairy Export Incentive Program (DEIP)***

USDA  
FAS, Commodity Credit Corporation (CCC)  
Marketing Operations Division  
1400 Independence Avenue, SW  
Room 4521, South Building  
Washington, DC 20250-1000  
Phone: (202) 720-6211  
FAX: (202) 720-0938  
Web site: <http://www.fas.usda.gov/mos/>

### ***Loans, loan guarantees, working capital guarantees, and export credit insurance***

Export-Import Bank of the United States  
Business Development Office  
811 Vermont Avenue, NW  
Washington, DC 20571  
Phone: (202) 565-3900  
U.S. Toll-free number (800) 565-EXIM (3946)  
FAX: (202) 565-3731  
Web site: <http://www.exim.gov>

### ***Economic development investment projects—finding investment opportunities, insurance, loans, and loan guarantees***

Overseas Private Investment Corporation  
1100 New York Avenue, NW  
Washington, DC 20527  
Phone: (202) 336-8400  
FAX: (202) 408-5145  
Web site: <http://www.opic.gov>

### ***Financial assistance programs***

U.S. Small Business Administration  
Office of International Trade  
Room 8100  
409 Third Street, SW, Eighth Floor  
Washington, DC 20416  
Phone: (202) 205-6720 or (800) 827-5722  
FAX: (202) 205-7272  
Web site: <http://www.sba.gov/oit>

Financial Assistance, Office of Business Loans: (202) 205-6490  
Web site: <http://www.sbaonline.sba.gov>

### **Trade Policy**

#### ***Plant and animal health technical barriers to trade***

USDA  
APHIS, International Services  
Trade Support Team  
1400 Independence Avenue, SW  
Room 1128, South Building  
Washington, DC 20250  
Phone: (202) 720-7677  
FAX: (202) 690-2861  
Web site: <http://www.aphis.usda.gov/is/tst/tsthome.html>

#### ***Meat and poultry products technical barriers to trade***

USDA  
FSIS, Office of Policy, Program Development, and Evaluation  
1400 Independence Avenue, SW  
Room 0002, South Building  
Washington, DC 20250  
Phone: (202) 690-2683  
FAX: (202) 720-8213  
Web site: <http://www.fsis.usda.gov/OPPDE/op/>

#### ***Food safety regulations and barriers***

USDA  
FAS, International Trade Policy  
Office of Food Safety and Technical Services  
1400 Independence Avenue, SW  
Room 0002, South Building  
Washington, DC 20550-1000  
Phone: (202) 690-2683  
FAX: (202) 720-8213  
Web site: <http://www.fas.usda.gov/itp/ofsts/ofsts.html>

### ***Multilateral trade policy affairs***

USDA  
FAS, International Trade Policy  
Multilateral Trade Negotiations Division  
1400 Independence Avenue, SW  
Room 5545, South Building, or Stop 1022  
Washington, DC 20250-1022  
Phone: (202) 720-1312  
FAX: (202) 720-1139

### ***Import policies and trade analysis***

USDA  
FAS, International Trade Policy  
Import Policies and Programs Division  
1400 Independence Avenue, SW  
Room 5530, South Building  
Washington, DC 20250-1021  
Phone: (202) 720-2916  
FAX: (202) 720-0876

### **Other**

### ***Global market development and education programs***

USDA  
Cooperative State Research, Education, and  
Extension Service  
1400 Independence Avenue, SW  
Room 3871, South Building  
Washington, DC 20250  
Phone: (202) 720-2506  
FAX: (202) 690-2975  
Web site: <http://www.reeusda.gov>

### ***Business development, information clearinghouse for U.S. businesses, organizations, and institutions interested in providing Agency for International Development-financed goods and services***

U.S. Small Business Administration  
Office of International Trade  
Room 600  
409 Third Street, SW, Sixth Floor  
Washington, DC 20416  
Phone: (202) 205-6720 or (800) 827-5722  
FAX: (202) 205-7272  
Business Development Assistance: (202) 205-6665  
Small Business Innovation Research Program: (202) 205-6450  
Office of Advocacy: (202) 205-6531  
International Trade Assistance: (202) 205-6720

### ***International trade development—agricultural specific market development and promotion programs, research, market information, and export conferences and seminars***

Oklahoma State University  
Center for International Trade Development  
204 CITD  
Hall of Fame Washington  
Stillwater, OK 74078-8084  
Phone: (405) 744-7693  
FAX: (405) 744-8973  
Web site: <http://www.okstate.edu/citd/citd1.html>

University of Washington  
Center for International Trade in Forest Products  
College of Forest Resources  
123 Anderson Hall, Box 352100  
Seattle, WA 98195  
Phone: (206) 543-8684  
FAX: (206) 685-0790  
Web site: <http://www.cintrafor.org>

University of Florida  
International Agricultural Trade and Development  
Center  
Food and Resource Economics Department  
P.O. Box 110240  
Gainesville, FL 32611-0240  
Phone: (352) 392-5069  
FAX: (352) 392-9898  
Web site: <http://www.fred.ifas.ufl.edu/iatdc/>

Washington State University  
International Marketing Program for  
Agricultural Commodities and Trade  
123 Hulbert Hall  
P.O. Box 646214  
Pullman, WA 99164-6214  
Phone: (509) 335-6653  
FAX: (509) 335-3598  
Web site: <http://impact.wsu.edu>

University of Georgia  
International Trade Development Center  
International Trade Division  
Small Business Development Center  
1180 East Broad Street - Chicopee Complex  
Athens, GA 30602-5412  
Phone: (706) 542-6762  
FAX: (706) 542-6776  
Web site: <http://www.sbdc.uga.edu>

Kansas World Trade Center  
350 West Douglas Avenue  
Wichita, KS 67202-2970  
Phone: (316) 262-3232  
FAX: (316) 262-3585  
Web site: <http://www.kansaswtc.org>

Iowa State University  
Midwest Agribusiness Trade Research and Information  
Center (MATRIC)  
578 Heady Hall  
Ames, IA 50011-1070  
Phone: (515) 294-1184  
FAX: (515) 294-6336  
Web site: <http://www.card.iastate.edu/matric/home.html>

North Dakota State University  
Northern Crops Institute  
Box 5183, SU Station  
Fargo, ND 58105  
Phone: (701) 237-7736  
FAX: (701) 237-7235  
Web site: <http://www.northern-crops.com>

Wheat Marketing Center  
Albers Mill Building  
1200 Northwest Naito Parkway  
Portland, OR 97209-2800  
Phone: (503) 295-0823  
FAX: (503) 295-2735  
Web site: <http://www.aracnet.com/~histgaz/albers.htm>

***Small business counseling—SCORE (Service Corps of Retired Executives)***

National SCORE Office  
Phone: (202) 205-6200 or (800) 827-5722  
Web site: <http://www.score.org/>

“One-stop” assistance to small businesses—Export SBDC’s

***Minority business management—proposal writing, financial planning, capital acquisition, business and market plan development, market identification, trade missions, trade fairs, and training seminars***

U.S. Department of Commerce  
Minority Business Development Agency  
Room 5096  
Washington, DC 20233  
Phone: (202) 377-3237  
FAX: (202) 377-5117  
Web site: <http://www.mbdba.gov>

**Trade Information Center**

A complete list of Federal trade assistance resources is beyond the scope of this publication. However, the U.S. Government has established a comprehensive “one-stop” information center for U.S. companies seeking information on Federal programs and activities that support U.S. nonagricultural exports. The Trade Information Center advises exporters on how to locate and utilize government programs and guides them through the export process.

U.S. Department of Commerce  
International Trade Administration  
Trade Information Center  
Room 7424  
14th and Constitution Avenue, NW  
Washington, DC 20230  
Phone: (800) USA-TRAD(E)/(800) 872-8723  
FAX: (202) 482-4473  
TDD: (800) 833-8723  
Web site: <http://www.ita.doc.gov/tic>

Many USDA programs and services are listed in this section. To find any USDA telephone number not listed here, contact the USDA Locator Service, (202) 720-USA.

## Publications

Exporters can obtain valuable information on export transportation, marketing strategies, financing, and other export-related issues from a myriad of publications. This section lists a few of the publications available to exporters.

Publications by USDA-AMS-TMP are available at no cost. For price information on other listed publications or to order, contact the publisher directly. Contact information for publishers is listed in the Publishers section of this book. In addition, many of these publications are available for loan from the National Agricultural Library. Check with your local library to request an interlibrary loan.

*A Basic Guide to Exporting*—U.S. Department of Commerce. 1992. Government Printing Office. Designed to help U.S. firms learn the costs and risks associated with exporting and to help develop a strategy for exporting.

*A Business of Details—Exporting High Value U.S. Agricultural Products*—(video and publication). USDA, AMS, TMP. 1995. Follows a shipment from farm to overseas market. Assists new exporters with identifying the questions that must be answered for each export transaction and identifies sources that can help answer these questions.

*A Guide for Livestock Exporters*—USDA, AMS, TMP. 1995. Information on planning and implementing the transportation of livestock to foreign markets.

*Breaking Into The Trade Game-A Small Business Guide to Exporting*—U.S. Small Business Administration and AT&T. Government Printing Office. 1995. A guide for developing an international marketing plan. This publication also covers export financing options for small businesses.

*The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks*—USDA, Agricultural Research Service. Handbook 66. Government Printing Office. 1986. Storage recommendations for horticultural crops.

*Export Directory of Refrigerated Carriers Serving Agriculture*—USDA, AMS, TMP. 1997. This reference guide was developed to help shippers locate carriers that transport perishable agricultural products in international trade.

*Exporters Encyclopaedia 1994-95*—Dun's Marketing Services, 3 Sylvan Way, Parsippany, NJ 07054. Phone: (800) 526-0651, FAX: (201) 605-6911. This is an annual publication with twice-monthly updates. This export reference has information on the export order, export markets, export know-how, communications data, and transportation data.

*Export Programs Guide 2001*—U.S. Department of Commerce, Trade Information Center, Government Printing Office. 2001. This publication is a business guide to Federal export assistance.

*Food and Agricultural Export Directory 1995*—USDA, FAS. (Report No.: Miscellaneous 1509.) Distributed by National Technical Information Service (NTIS). Provides listing and brief descriptions of Federal and State agencies, trade associations, and other organizations that offer advice and services in exporting agricultural and food products.

*Foreign Agricultural Trade of the United States (FATUS)*—USDA, Economic Research Service (ERS), National Agricultural Statistics Service (NASS). Annual report with monthly supplements. Current and historical data on U.S. foreign trade in agricultural products.

*Guide to Incoterms 2000*—International Chamber of Commerce (ICC) Publishing Corp. (No. 620/00.) Incoterms stands for international commercial terms. This publication explains the function, cost, and risk in transferring goods from seller to buyer for each trade term.

*Guidelines For the Air Shipment of Seafood*—(English or Spanish) Air Transport Association of America, 1709 New York Avenue, NW, Washington, DC 20006-5206. Phone: (202) 626-4000.

*Incoterms 2000*—ICC Publishing Corp. (No. 560.) This publication defines international trade terms.

*International Agriculture and Trade Reports-Situation and Outlook Series*—USDA, ERS. A four-report series includes China, Europe, Former USSR, and NAFTA. Drawn from original foreign source materials, these reports explain how basic forces are changing agriculture and agricultural trade.



*International Trade Reporter, Export Reference Manual*—Binders with weekly updates. The Bureau of National Affairs, 1231 25th Street, NW, Washington, DC 20037. Phone: (800) 372-1033, FAX: (800) 253-0332. This publication includes information on regulations, basic exporting information, country reference information, and information on mail shipments.

*Official Export Guide 1996*—Annual publication. K-III Directory Corporation. The export reference has information on export how-to; country profiles; information sources; service directories; terms and symbols; schedule B; export administration regulations; hazardous materials; and export documents.

*Perishable Cargo Handling Guide*—International Air Transport Association (IATA), 800 Place Victoria, Montreal, Quebec, Canada H4Z 1M1. Phone: (514) 390-6770, FAX: (514) 847-2660. 2000. A general guide to air transport of perishable cargo.

*Principles of Cargo Handling and Perishable Cargo Handling Guide*—International Air Transport Association (IATA), 2000 Peel Street, Montreal, Quebec, Canada H3A 2R4. Phone: (514) 844-6311, FAX: (514) 844-3788. 1992. A general guide to air transport of perishable cargo.

*Protecting Perishable Foods During Transport by Truck*—USDA, AMS, TMP. Handbook 669. 1995. This handbook is a compilation of best industry practices on handling and transportation of perishable foods.

*Tropical Products Transport Handbook*—(English or Spanish) USDA, AMS, TMP. Handbook 668. 1989. The purpose of this handbook is to provide transportation recommendations for fruits and vegetables, live plants, and cut flowers.

*Uniform Customs and Practice for Documentary Credits*—ICC Publishing Corporation. No. 500. 1993. This publication provides the rules governing letters of credit in about 200 countries worldwide.

*The World is Your Market - An Export Guide for Small Business*—U.S. Department of Commerce, Braddock Communications, Inc., 11201 Sunset Hills Road, Suite 200, Reston, VA 22090-4704. Phone: (703) 471-6543, FAX: (703) 709-7095. 1990. This publication provides the mechanics of exporting, export assistance resources, and a telephone directory.

## Journals

*Agricultural Trade Highlights*—Monthly report. USDA, FAS. Contains information on U.S. agricultural exports, as well as specialized coverage of trade topics. Distributed by NTIS.

*Agricultural Ocean Transportation Trends*—Semiannual report. USDA, AMS, TMP. Provides agricultural shippers, who rely on good market information and assistance, updated information on the ocean container market's cost and service trends.

*Ag Exporter*—Monthly magazine. USDA, FAS. Distributed by NTIS. Contains information on overseas markets, buying trends, trade policy developments, country briefs, marketing news, overseas promotional activities, and export services.

*Export Today*—Monthly magazine. Trade Communications, Inc., P.O. Box 28189, Washington, DC 20038. Phone: (800) 824-9785, FAX: (202) 783-5966.

*Official Airline Guides (OAG)—Air Cargo Guide*—Monthly publication. OAG Air Cargo Guide, Reed Travel Group, 2000 Clearwater Drive, Oak Brook, IL 60521. Phone: (800) 323-3537, ext. 5AG22, FAX: (708) 574-6565. Directory of cargo flight schedules, foreign trade zones, documentary requirements, air freight forwarders, and customs house brokers.

*Outlook for U.S. Agricultural Exports*—Quarterly publication. USDA, ERS and FAS.

*Pacific Shipper*—Weekly publication. Commonwealth Media, Inc., 225 Bush Street, Suite 353, San Francisco, CA 94104-4207. A directory of steamship companies, their routes, departure dates, and estimated arrival dates.

*The Journal of Commerce*—Daily publication. The Journal of Commerce, 110 Wall Street, New York, NY 10005. Phone: (800) 221-3777. Lists current foreign requests to represent, distribute, or purchase a product. (This information also can be found in AgExport Connections published by USDA). Also includes "Shipcards," a list of steamship companies, their routes, departure dates, and estimated arrival dates.

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## Glossary

**Ad Valorem**—According to value.

**Air waybill**—A bill of lading that covers both domestic and international air transport of goods to a specified destination. This is a non-negotiable instrument of air transport that serves as a receipt for the shipper, indicating that the carrier has accepted the goods listed and obligates itself to carry the consignment to the airport of destination according to specified conditions.

**Alongside**—A phrase referring to the side of a ship. Goods to be delivered “alongside” are to be placed on the dock or barge within reach of the transport ship’s tackle so they can be loaded aboard the ship.

**BAF (bunker adjustment factor)**—An ancillary charge assessed by carriers on some ocean container freight shipments to account for fluctuation in fuel cost.

**Barratry**—Negligence or fraud on the part of the master or crew of a ship, resulting in a loss to the owners of the ship or her cargo.

**Bill of lading**—A document that establishes the terms of a contract between a shipper and a transportation company under which freight is to be moved between specified points for a specified charge. Usually prepared by the shipper on forms issued by the carrier, it serves as a document of title, a contract of carriage, and a receipt for goods.

**Bonded warehouse**—A warehouse authorized by Customs authorities for storage of goods on which payment of duties is deferred until the goods are removed.

**Booking**—An arrangement with a steamship company for the acceptance and carriage of freight.

**Cabotage**—Refers to the required use of domestic carriers for shipments in U.S. coastal waters.

**CAF (currency adjustment factor)**—An ancillary charge on some ocean freight shipments, expressed as a percentage of a base rate, to compensate ocean carriers for fluctuations in the value of the U.S. dollar against foreign currencies.

**Carrier**—The company that transports goods from one point to another, which may be a vessel, airline, trucking company, or railroad.

**Certificate of inspection**—A document certifying that merchandise (such as perishable goods) was in good condition immediately prior to its shipment.

**Certificate of insurance**—A document stating that insurance is in effect.

**Certificate of origin**—A document, required by certain foreign countries for tariff purposes, certifying the country of origin of specified goods.

**CFR (cost and freight)**—A pricing term indicating that the cost of the goods and freight charges are included in the quoted price. The buyer arranges for and pays insurance.

**CFS (container freight station)**—A carrier facility where less-than-containerload shipments are consolidated for shipment or unloaded for final delivery.

**Chargeable weight**—The weight used to determine air-freight charges. The chargeable weight may be the dimensional weight or, for container shipments, the gross weight of the shipment less the tare weight of the container.

**C & I (cost and insurance)**—A pricing term indicating that the cost of the product and insurance is included in the quoted price. The buyer is responsible for freight to the named port of destination.

**CIF (cost, insurance, and freight)**—A pricing term indicating that the cost of the goods, insurance, and freight is included in the quoted price.

**Claim agent**—An overseas representative of the insurance company.

**Commercial invoice**—An itemized list of goods shipped, usually included among an exporter’s collection papers.

**Common carrier**—An individual, partnership, or corporation that transports persons or goods for compensation.

**Confirmed letter of credit**—A letter of credit, issued by a foreign bank, with validity confirmed by a U.S. bank. When confirmed, the U.S. bank undertakes responsibility for payment even if the foreign buyer or bank defaults.

**Contingency insurance**—When a product is sold under terms that require the buyer to provide insurance coverage, the seller may elect to purchase “back-up insurance” in case the coverage provided by the buyer is not sufficient to cover the value of the shipment.

**Consignee**—The person or firm to whom something is sold or shipped, the buyer or importer.

**Consignor**—The person or firm from whom the goods have been received for shipment, the seller, shipper, or exporter.

**Consular invoice**—A document, required by some foreign countries, describing a shipment of goods and showing information, such as the consignor, consignee, and value of the shipment. Certified by a consular official of the foreign country, it is used by the country’s customs officials to verify the value, quantity, and nature of the shipment.

**Container**—A uniform, sealed, reusable metal “box” (generally 40 feet in length, able to hold about 40,000 pounds) in which goods are shipped by vessel or rail. The use of containers (or containerization) in trade is generally thought to require less labor than more traditional shipment methods and reduce losses due to breakage, spoilage, and pilferage.

**Container ship**—A ship specially constructed to handle containerized cargo.

**Credit risk insurance**—Insurance designed to cover risks of nonpayment for delivered goods.

**Customs**—The authorities designated to collect duties levied by a country on imports and exports. The term also applies to the procedures involved in such collection.

**Customhouse broker**—An individual or firm licensed to enter and clear goods through Customs.

**CY (container yard)**—A carrier facility where full containers are held.

**Demurrage**—A surcharge assessed by steamship lines and railroads for storage at their port facility longer than the allotted “free time.”

**Destination control statement**—Any of various statements that the U.S. Government requires to be displayed on export shipments and that specify the destinations for which export of the shipment has been authorized.

**Dock receipt**—A receipt issued by an ocean carrier to acknowledge receipt of a shipment at the carrier’s dock or warehouse facilities.

**Export license**—A Government document that permits the “licensee” to engage in the export of designated goods to certain destinations.

**FAF (fuel adjustment factor)**—An ancillary charge on some ocean freight shipments to account for fluctuation in fuel costs. Also referred to as BAF or bunker adjustment factor.

**FAS (free alongside)**—A pricing term indicating that the quoted price includes the cost of delivering the goods alongside a designated vessel.

**FCL (full container load)**—Shipment of a full container.

**FEU (40-foot-equivalent unit)**—Commonly describes a 40-foot container.

**FOB (free on board)**—A pricing term indicating that the quoted price includes the cost of loading the goods into transport vessels at the specified place.

**Force majeure**—The title of a standard clause in marine contracts exempting the parties for nonfulfillment of their obligations as a result of conditions beyond their control, such as earthquakes, floods, or war.

**Freight forwarder**—An independent business that handles export shipments for compensation.

**General export license**—Any of various export licenses covering export commodities for which validated export licenses are not required. No formal application or written authorization is needed to ship exports under a general export license.

**Gross weight**—The full weight of a shipment, including goods and packaging.

**Harbor tax**—A tax paid quarterly by exporters to U.S. Customs based on a percentage of their total value of exports.

**Import license**—A document required and issued by some national governments for the importation of goods into their country.

**Independent action**—When an ocean shipping conference member carrier sets a tariff for a rate or service that is different from the established conference tariff.

**Inland bill of lading**—A bill of lading used in transporting goods overland to the exporter's international carrier. Although a through bill of lading can sometimes be used, it is usually necessary to prepare both an inland bill of lading and an ocean bill of lading for export shipments.

**Inward charges**—Charges incurred by a ship or cargo when entering a port.

**IPI (interior points intermodal)**—A term used by ocean carriers to describe door-to-door delivery service. Ocean carriers frequently quote rates on an IPI basis.

**Keelage**—A duty charged for permitting a ship to enter and anchor in a port or harbor.

**Landing charges**—The initial charges for landing imported goods, such as those for receiving goods from dockside vessels or from barges to lighters. They may also cover wharfage or delivery from the dock to land conveyance or warehouse.

**Less than containerload (LCL)**—A quantity of product/commodity less than the amount needed to completely fill a container.

**Liner conference**—An agreement among carriers that regularly serve a particular trade route to establish freight rates and service levels.

**Liner discharge**—Payment by the shipowner for unloading of cargo, including stevedore wages.

**Manifest**—A list of passengers or an invoice of cargo.

**Marine insurance**—Insurance that compensates the owner of goods transported overseas in the event of loss that cannot be legally recovered from the carrier. Also covers air shipments.

**Marking**—Letters, numbers, and other symbols placed on cargo packages to facilitate identification.

**NVOCC (non-vessel operating common carrier)**—Cargo consolidator of small shipments in ocean trade, generally arranging for or performing containerization functions at the port.

**Open insurance policy**—A marine insurance policy that applies to all shipments made by an exporter over a period of time rather than to one shipment only.

**Package cargo**—Cargo in boxes, barrels, crates, bales, or other containers, as opposed to bulk or loose cargo.

**Pallet**—A small wooden platform on which cargo is stored for ease of loading and unloading. Cargo shipped on pallets is referred to as palletized cargo.

**Perils of the sea**—A marine insurance term used to designate heavy weather, stranding, lightning, collision, and sea water damage.

**Phytosanitary inspection certificate**—A certificate, issued by the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, to satisfy import regulations for foreign countries, indicating that a U.S. shipment has been inspected and is free from harmful pests and plant diseases.

**Port authority**—The entity whose duty is to construct, manage, maintain, and improve a port. Ports may be administered by States, municipalities, statutory trusts, or private or corporate entities. It also may be known as harbor authority, harbor board, port trust, or port commission.

**Port charges**—Fees assessed against a vessel, cargo, and passengers while in port, including harbor dues, tariff charges, wharfage, towage, etc.

**Pro forma invoice**—An invoice provided by a supplier prior to the shipment of merchandise, informing the buyer of the kinds and quantities of goods to be sent, their value, and important specifications (weight, size, etc.).

**Quotation**—An offer to sell goods at a stated price and under specified conditions.

**Roll-on/Roll-off (Ro/Ro)**—A term applied to ships that are outfitted so vehicles or heavy machinery can be driven on or off without the use of special cranes.

**Schedule B**—Refers to “Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States.” All commodities exported from the United States must be assigned a ten-digit Schedule B number.

**Shipment**—Freight tendered to a carrier by one consignor at one place for delivery to one consignee at one place on one bill of lading.

**Shipper’s export declaration**—A form required by the U.S. Department of Commerce and the U.S. Customs Service for all shipments and prepared by a shipper, indicating the value, weight, destination, and other basic information about an export shipment.

**Shipper’s letter of instruction**—Shippers’ communication to their freight forwarder or carrier including all the details of the shipment. This communication is used by the forwarder or carrier to complete the bill of lading and other shipping documents.

**Ship’s manifest**—An instrument in writing, signed by the captain of a ship, that lists the individual shipments constituting the ship’s cargo.

**Steamship conference**—A group of steamship operators that collectively set rate and service levels in a specific geographic trade route.

**Stowage**—The loading of a vessel by handling and placing goods within the container so as to ensure stability of the container, maximum use of space, safety of cargo, and efficient loading and unloading. A description of each item and its disposition in the vessel after loading is contained in the ship’s stowage plan.

**Tare weight**—The weight of a container and packing materials without the weight of the goods it contains.

**Tariff**—A document issued by carriers or conferences that establishes all rules, rates, and charges for the movement of goods.

**TEU (20-foot-equivalent unit)**—Commonly describes a 20-foot container.

**Terminal handling charges**—An ancillary charge on some ocean freight shipments to cover the cost of moving the container from the container yard to the ocean vessel.

**Tramp steamer**—A ship not operating on regular routes or schedules.

**TVA (time volume agreement)**—A contract between a carrier and shipper that specifies the movement of a certain number of containers over a period of time, usually 12 months.

**U.S. flag vessel**—A merchant ship under U.S. registry.

**Validated export license**—A required document issued by the U.S. Government authorizing the export of specific commodities. This license is for a specific transaction or time period in which the exporting is to take place.

**Warehouse receipt**—A receipt issued by a warehouse listing goods received for storage.

**Wharfage**—A charge assessed by a pier or dock owner for handling incoming or outgoing cargo.

## Bibliography

- (1) Airline Tariff Publishing Company. *Official Air Freight Tariff Revisions*. Washington, DC, December 1991.
- (2) Air Transport Association of America. *Air Cargo from A to Z*. Washington, DC.
- (3) Air Transport Association of America, National Fisheries Institute. *Guidelines for the Air Shipment of Fresh Fish and Seafood*. 2d ed. Washington, DC.
- (4) American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. *ASHRAE Handbook, Refrigeration, Systems and Applications*. ASHRAE, Atlanta, GA, 1990.
- (5) Ashby, B.H., R.T. Hinsch, L.A. Risse, W.G. Kindya, W.L. Craig, and M.T. Turezyn. *Protecting Perishable Foods During Transport by Truck*. HBK-669. USDA, AMS, September, 1987.
- (6) Atlantic Mutual Companies. *Buyers Guide To Marine Cargo Insurance*. New York, NY, 1990.
- (7) The Bureau of National Affairs, Inc. *International Trade Reporter Export Reference Manual*. Washington, DC, 1991.
- (8) Cassell, Clark C. *The World is Your Market - An Export Guide for Small Business*. Edited by William Delphos. Braddock Communications. Washington, DC, 1990.
- (9) Chubb Group of Insurance Companies, Ocean Marine Department, Ocean Marine Claim Department. *Ocean Cargo Claims Handbook*. 1988.
- (10) CIGNA Companies. *Ports of the World: a guide to cargo loss control*. 14th ed. Philadelphia, PA.
- (11) Fuell, L. D., D. C. Miller, and M. Chesley. *Dictionary of International Agricultural Trade*. USDA, FAS, June 1988.
- (12) Friedheim, Amy. *Ocean Liner Freight Rates and Services*. USDA, AMS, May 1991.
- (13) Hardenburg, R. E., A. E. Watada, and C. Y. Wang. *The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks*. HBK-66. USDA, ARS, September 1986.
- (14) Lassanyi, Mary E. *Directory of Export and Trade Assistance*. USDA, NAL, November 1991.
- (15) Lipton, W.J. and J.M. Harvey. *Compatibility of Fruits and Vegetables During Transport in Mixed Loads*. MRR-1070. USDA, Fresno, CA, 1977.
- (16) Marine Office of America Corporation. "Air Cargo Insurance & Transportation." Unpublished paper, 1991.
- (17) Maryland Office of International Trade, Department of Economic and Employment Development. *Maryland Exporters' Guide*. Baltimore, MD, January 1988.
- (18) McGregor, Brian M. *Tropical Products Transport Handbook*. HBK-668. USDA, AMS, September 1989.
- (19) National Archives and Records Administration, Office of the Federal Register. *The United States Government Manual 1991/92*. 1992.
- (20) Nicholas, C. J. *Export Handbook for U.S. Agricultural Products*. HBK-593. USDA, AMS, March 1985.
- (21) Safeway Stores, Inc. *Transit and Storage Properties of Produce Commodities*. Produce Marketing Association, Newark, DE. 1986.
- (22) Sea-Land Service, Inc. "An International Shipment." Unpublished paper, February 1982.
- (23) Society of American Florists. *Care and Handling of Flowers and Plants*. SAF, Alexandria, VA, 1985.
- (24) "10 Questions To Ask When Choosing a Freight Forwarder." *AgExporter*. USDA, AMS, January 1991.
- (25) U.S. Department of Agriculture, Foreign Agricultural Service. "Export Sales Reporting." Unpublished paper, February 1983.

- (26) U.S. Department of Agriculture, Foreign Agricultural Service. "Fact Sheet." Unpublished paper, March 1992.
- (27) U.S. Department of Agriculture, Foreign Agricultural Service. *Food & Agricultural Export Directory 1991*. MPN-1497, September 1991.
- (28) U.S. Department of Agriculture, Office of Transportation. "Transportation Facts." Unpublished paper, December 1988.
- (29) U.S. Department of Commerce, Bureau of the Census. *Correct Way to Fill Out the Shipper's Export Declarations*. January 1988.
- (30) U.S. Department of Commerce, Federal Express Corporation. *A Basic Guide to Exporting*. January 1992.









