Agricultural Export
Transportation Workbook

by

Ellen M. Welby

and

Brian M. McGregor

International Transportation Branch
Transportation and Marketing Division

February 1993
Acknowledgments

The authors are grateful to Mary E. Lassanyi (USDA-NAL) for allowing a portion of her Directory of Export and Trade Assistance to be included; and to Oscar A. Lopez (Overseas Shipping Company) for providing sample documents. The authors acknowledge the Air Transport Association of America, Bureau of the Census, Marine Office of America Corp., Sea-Land Service, Inc., U.S. Department of Transportation, and the U.S. Department of Agriculture’s Foreign Agricultural Service for their assistance.

Mention of companies or commercial products does not imply recommendation or endorsement by the U.S. Department of Agriculture over others not mentioned.
## Contents

<table>
<thead>
<tr>
<th>Subject</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Overview</td>
<td>3</td>
</tr>
<tr>
<td>Freight Forwarding</td>
<td>9</td>
</tr>
<tr>
<td>International Freight Forwarder</td>
<td>9</td>
</tr>
<tr>
<td>Non-Vessel Operating Common Carrier</td>
<td>10</td>
</tr>
<tr>
<td>Customs Broker</td>
<td>10</td>
</tr>
<tr>
<td>Air and Ocean Cargo Services</td>
<td>11</td>
</tr>
<tr>
<td>Air Cargo</td>
<td>11</td>
</tr>
<tr>
<td>Ocean Cargo</td>
<td>15</td>
</tr>
<tr>
<td>Transport Documentation</td>
<td>23</td>
</tr>
<tr>
<td>Pro Forma Invoice</td>
<td>24</td>
</tr>
<tr>
<td>Commercial Invoice</td>
<td>25</td>
</tr>
<tr>
<td>Inspection Certificates</td>
<td>25</td>
</tr>
<tr>
<td>Packing List</td>
<td>26</td>
</tr>
<tr>
<td>Dock Receipt</td>
<td>26</td>
</tr>
<tr>
<td>Certificate of Origin</td>
<td>27</td>
</tr>
<tr>
<td>Consular Invoice</td>
<td>27</td>
</tr>
<tr>
<td>Insurance Certificate</td>
<td>27</td>
</tr>
<tr>
<td>Shipper's Export Declaration</td>
<td>27</td>
</tr>
<tr>
<td>Export Licensing</td>
<td>33</td>
</tr>
<tr>
<td>Schedule B Harmonized Commodity Description and Coding System</td>
<td>34</td>
</tr>
<tr>
<td>Bill of Lading</td>
<td>35</td>
</tr>
<tr>
<td>Air Waybill</td>
<td>35</td>
</tr>
<tr>
<td>Sample Transport Documents</td>
<td>36</td>
</tr>
<tr>
<td>Methods of Payment</td>
<td>55</td>
</tr>
<tr>
<td>Cash in Advance</td>
<td>55</td>
</tr>
<tr>
<td>Letters of Credit</td>
<td>56</td>
</tr>
<tr>
<td>Drafts</td>
<td>57</td>
</tr>
<tr>
<td>Open Account</td>
<td>58</td>
</tr>
<tr>
<td>Additional Methods of Payment</td>
<td>58</td>
</tr>
<tr>
<td>Currency of Payment</td>
<td>58</td>
</tr>
<tr>
<td>Insurance</td>
<td>61</td>
</tr>
<tr>
<td>Cargo Insurance</td>
<td>61</td>
</tr>
<tr>
<td>Filing a Claim</td>
<td>64</td>
</tr>
</tbody>
</table>
Subject | Page
--- | ---
Transport Guidelines | 67
Transport Only Top-Quality Products | 67
Ensure Quality Control With Grading | 68
Maintain Quality With Effective Packaging | 70
Precool Produce To Ensure Quality | 77
Choose the Best Mode of Transportation | 80
Check the Transport Equipment Before Loading | 84
Use Proper Loading Practices | 85
Use Recommended Transit and Storage Procedures | 91
Transport Guideline Tables | 93
Transport Guideline Figures | 94

Government Regulations | 129
The Shipping Act of 1984 | 129
Export Sales Reporting | 132
Dangerous Goods | 133

Trade Assistance | 135
U.S. Department of Agriculture | 135
Export-Import Bank of the United States | 145
Overseas Private Investment Corporation | 145
U.S. Small Business Administration | 146
U.S. Department of Commerce | 146
Federal Maritime Commission | 148
U.S. Department of Transportation | 148
U.S. Department of the Treasury | 149
State Departments of Agriculture | 149
State Government Trade Offices | 160

Publications | 171
Publications | 171
Journals | 174
Publishers | 175

Databases | 179
Databases | 179
Online Service Providers | 200

Glossary | 211

Bibliography | 217
Introduction

Agricultural export transportation is a complex process, involving many parties. This workbook will look at who the key players are, where they fit in, and what their responsibilities are.

It will provide tips on selecting a freight forwarder that can meet your company’s export needs. Although the shipper can rely on freight forwarders to handle most of the logistics, the shipper is ultimately responsible. This workbook was designed as a reference for agricultural shippers.

The right freight forwarder is a valuable ally, but the shipper must also take an active role. By understanding air and ocean cargo services, transport documentation, insurance, transport guidelines, and Government regulations, shippers can work with the freight forwarder and contribute to the success of their export venture.

This workbook looks at how air carriers and steamship companies operate, and how to read and understand their tariffs. It explains the more common documents used in export transportation and provides completed samples. It also explains the different types of cargo insurance available, where to obtain them, 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. Also included are some of the Government transportation regulations that affect export shipments. The sections on trade assistance, publications, and databases are included to provide shippers with other sources of information when the answer cannot be found within the text.

This workbook will provide shippers with a foundation for understanding agricultural export transportation. It can be used as a reference when export transportation questions arise, by either answering questions directly or guiding shippers to the right source.
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

1. After initial contact between the shipper and consignee is established, the contracted terms of sale, and the flow of goods and documents may be initiated with the consignee’s application to the bank for a letter of credit. (Letters of credit are not always used, but will be assumed to be issued in this outline.)

2. Consignee’s bank issues the letter of credit to the shipper.

3. Consignee sends a purchase order accompanied by the letter of credit to the shipper.

4. Shipper issues instructions to the freight forwarder for shipping the goods.

5. Shipper’s freight forwarder selects a suitable vessel and port, contacts the carrier’s office, and books space on a particular vessel.

6/7. Shipper’s freight forwarder prepares and submits a set of ocean bills of lading and an export declaration to the ocean carrier.

8. Shipper’s freight forwarder selects an inland carrier and transmits the inland bill of lading and delivery instructions to it.

9. The inland carrier picks up the cargo at the shipper’s location and issues a cargo receipt to the shipper.

10. Inland carrier delivers the goods to the outbound pier terminal together with a set of prepared dock receipts.

11. After taking delivery of the cargo, the outbound terminal gives a signed copy of the dock receipt to the inland carrier.

12. Outbound pier terminal sends one copy of the dock receipt to the carrier’s office.

Source: Sea-Land Service, Inc.
13. Outbound carrier’s office matches the copy of the dock receipt with the set of ocean bills of lading received from the shipper’s freight forwarder, prepares a loading stowage plan, and transmits it to the outbound pier terminal.

14. Goods are lifted aboard and stowed on the vessel, according to the stow plan, for transport to the discharge port.

15. After the cargo has been loaded, the terminal sends the bills for stevedoring and wharfage to the outbound carrier’s office.

16. Outbound carrier’s office issues an ocean bill of lading with on-board certification, when required, to the shipper’s freight forwarder.

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. Shipper’s freight forwarder delivers the original bill of lading, with the bill covering the inland freight, the stevedoring, and the freight forwarder’s services, to the shipper.

19. Shipper submits a commercial set—a negotiable bill of lading, an invoice and insurance certificate, and a customs invoice, if necessary—to the bank.

20. After receipt and acceptance of the commercial set, the shipper’s bank pays the shipper in accordance with the letter of credit issued by the consignee’s bank.

21. Shipper’s bank transmits the commercial set and a debit invoice to the consignee’s bank.

22. Shipper sends a non-negotiable copy of the bill of lading to the consignee as notification that the cargo has been shipped.

23. After the vessel has sailed, the outbound carrier’s office transmits a manifest, freight bills, delivery receipts, a container list, and an arrival notice to the carrier’s office overseas.

24. Outbound carrier’s office submits to U.S. customs one non-negotiable bill of lading copy with the shipper’s export declaration. This must be accomplished within 4 working days of the vessel’s clearance.

25. Inbound carrier’s office transmits copies of the manifest to the inbound pier terminal.

26. Consignee’s bank releases the commercial set to the consignee against payment of the invoice amount.
27. Before the ship’s arrival, the inbound carrier’s office issues to the consignee an arrival notice and invoice covering the ocean freight and other charges due (if a collect shipment).

28. Consignee transmits the commercial set, arrival notice and invoice, and forwarding instructions to the customs broker.

29. Consignee’s 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.

30. Upon receipt of freight due (if a collect shipment) and the negotiable bill of lading, the inbound carrier’s office releases the cargo to the consignee’s 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. Consignee’s customs broker submits to the local customs office the proper documents and duties due for clearance in accord with local regulations.

33. Customs office authorizes the release of the cargo to the customs broker.

34. Customs office also notifies the customs inspector at the inbound pier terminal that the cargo may be released. (This is the case when the release is not being effected at the berth.)

35. Customs broker issues a delivery order to the inbound pier terminal authorizing delivery of the cargo to the designated inland carrier.

36. Consignee’s customs broker issues an inland bill of lading to the selected inland carrier.

37. Inland carrier picks up the cargo at the inbound pier terminal.

38. Inland carrier delivers the cargo to the consignee and receives a cargo receipt in return.

39. Inland carrier issues a freight bill to the consignee’s customs broker.

40. With the shipment having been completed, the consignee’s customs broker issues a bill to the consignee covering ocean freight, terminal charges, inland freight, and fees for the customs broker’s services.
Responsibilities

Shippers

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

2 Source: Sea-land Service, Inc., and the Port Authority of New York and New Jersey
• 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 break bulk 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:
  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 where required

Customs Inspectors

• Check import documents
• 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, USDA clearances
- 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
- Responsible for the development and implementation of new methods and technology

Insurance Surveyors

- Survey cargo damage as requested by shipper or carrier
Freight Forwarding

The international freight forwarder plays an integral part in the transportation process. Freight forwarders act on behalf of the exporter in arranging the ocean or air transport service. 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. 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 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**—There are several criteria to consider when selecting a freight forwarder:

- Is the freight forwarder licensed by the Federal Maritime Commission to handle ocean cargo?
Is the freight forwarder registered with the International Air Transport Association (IATA)\(^1\) to deal with international air cargo?

Is the freight forwarder financially stable?

Does the freight forwarder have a record of customer satisfaction?

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

Does the freight forwarder have a network of overseas agents?

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

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?

### 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.

### 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 to be used. Some freight forwarders are also customs brokers.

---

\(^1\) To register, freight forwarders must meet International Air Transport Association criteria regarding financial and credit standing, physical facilities, professional qualifications, and ethical practice.
Air and Ocean Cargo Services

When transporting U.S. agricultural products overseas, the shipper ideally looks for the fastest and most efficient mode of transportation that will deliver the shipment in the best possible condition at the lowest possible cost. The actual selection will be a compromise among these factors. The mode 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. The following is a look at air and ocean shipping options.

Air Cargo

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. When conferences reach an agreement, they file a tariff with the U.S. Department of Transportation (DOT). If the air carriers cannot reach an agreement, they file their tariffs individually with DOT. These filed tariffs usually represent the maximum amount that regulators will allow to be charged for air cargo. Only when a shipper is charged over the maximum amount stated in the filed tariff would regulating agencies become involved.

Tariff--Each carrier or IATA conference files its tariffs with DOT. Tariffs define the rate, rules, and regulations associated with air cargo on a given carrier or conference. Tariffs essentially 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.

This part of the workbook will explain how to read an air cargo tariff and determine the applicable rate for a shipment of cherries going from Oakland, California, to Tokyo, Japan, using selected pages from an actual tariff.

Rules and rates for a specific commodity, such as cherries, are often referred to in the tariff by their commodity number. The commodity number for cherries, found in the rules section (page 12), is 0477.

The actual tariff that these samples represent includes 35 pages of general and commodity-specific rules. Page 13 is just one example of a rule that applies directly to a shipment of cherries [(I) Deposit Policy for Transportation of Cherry Shipments from the U.S.A].
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>COMMODITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>0129</td>
<td>Alcoholic beverages, namely: liquors, wines, beers.</td>
</tr>
<tr>
<td>0130</td>
<td>Wines, N.E.S.</td>
</tr>
<tr>
<td>0300</td>
<td>Fish and seafood, N.E.S., excluding inedible live fish.</td>
</tr>
<tr>
<td>0301</td>
<td>Fish and seafood, excluding caviar, salmon, shellfish, and/or inedible live fish.</td>
</tr>
<tr>
<td>0302</td>
<td>Fish and/or seafood.</td>
</tr>
<tr>
<td>0306</td>
<td>Fish, edible, whole or processed, in the following forms: fresh; frozen; dried; canned.</td>
</tr>
<tr>
<td>0310</td>
<td>Clams, oysters, and scallops.</td>
</tr>
<tr>
<td>0315</td>
<td>Crabs, crawfish, and lobster.</td>
</tr>
<tr>
<td>0320</td>
<td>Eels</td>
</tr>
<tr>
<td>0323</td>
<td>Tuna, fresh.</td>
</tr>
<tr>
<td>0325</td>
<td>Fresh fish</td>
</tr>
<tr>
<td>0326</td>
<td>Fish, N.E.S.</td>
</tr>
<tr>
<td>0356</td>
<td>Fish, namely: crabs, and/or shrimps, N.E.S.</td>
</tr>
<tr>
<td>0380</td>
<td>Shrimp</td>
</tr>
<tr>
<td>0386</td>
<td>Lobsters</td>
</tr>
<tr>
<td>0387</td>
<td>Shrimp, frozen.</td>
</tr>
<tr>
<td>0400</td>
<td>Fruits, berries, and/or melons, N.E.S.</td>
</tr>
<tr>
<td>0404</td>
<td>Fruit pulp, frozen</td>
</tr>
<tr>
<td>0456</td>
<td>Kiwifruit</td>
</tr>
<tr>
<td>0477</td>
<td>Cherries</td>
</tr>
<tr>
<td>0485</td>
<td>Pineapples</td>
</tr>
<tr>
<td>0488</td>
<td>Papayas</td>
</tr>
<tr>
<td>0495</td>
<td>Papayas</td>
</tr>
<tr>
<td>0514</td>
<td>Pastry dough</td>
</tr>
<tr>
<td>0600</td>
<td>Meat, namely: slaughtered poultry and game</td>
</tr>
<tr>
<td>0601</td>
<td>Meat</td>
</tr>
<tr>
<td>0602</td>
<td>Meat, namely: slaughtered poultry and game, sausage, bologna, and/or frankfurters.</td>
</tr>
<tr>
<td>0603</td>
<td>Meat and seafood, produce, N.E.S.</td>
</tr>
<tr>
<td>0604</td>
<td>Meat, N.E.S.</td>
</tr>
<tr>
<td>0670</td>
<td>Horse flesh</td>
</tr>
</tbody>
</table>

For unexplained abbreviation, reference marks and symbols see ICGT-1, C.A.B. NO. 583.

ISSUED: December 23, 1991
EFFECTIVE: January 1, 1992

Source: Airline Tariff Publishing Company
Rule 45

PAYMENT OF CHARGES: (Continued)

(H) SERVICE CHARGE: In addition to weight (or volume) charge or valuation charge referred to heretofore, service charges will be assessed when applicable to the consignment in accordance with carrier's tariffs.

(I) DEPOSIT POLICY FOR TRANSPORTATION OF CHERRY SHIPMENTS FROM THE U.S.A.

1. If the carrier confirms space for cherry shipments on a specific flight, a deposit as specified below will be required from the shipper.

2. The carrier will credit the amount deposited toward the freight charges due after the shipment for which space has been reserved has moved on the specified flight.

3. The amount deposited will be refunded to the shipper if the space requested and confirmed is cancelled by the shipper not less than 48 hours prior to the scheduled departure of the flight on which space has been reserved. If cancellation for space reserved is received by the carrier less than 48 hours prior to the scheduled departure of the specified flight, the amount of deposit will not be refunded by the carrier.

<table>
<thead>
<tr>
<th>CONTAINER TYPE DEPOSIT AMOUNT PER CONTAINER</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,6</td>
</tr>
<tr>
<td>USD 750.00</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>USD 350.00</td>
</tr>
</tbody>
</table>

Rule 50

BASIS OF CHARGES

(A) Rates and charges for carriage shall consist of the total of the weight or volume charge, whichever is greater.

(B) Items which do not permit other cargo to be loaded on top of it (in accordance with Rule No. 95) shall be deemed to be occupying the void space above it. Carrier will include the difference between the height of the item being shipped and the top of the container or doorway, as described below:

1. If the shipment is being moved in a wide-body aircraft on the originating sector of the routing, the maximum height measurement will be 58 inches.

2. If the shipment is being moved in a narrow-body aircraft on the originating sector of the routing, the maximum height measurement will be 29 inches.
<table>
<thead>
<tr>
<th>RATE TYPE</th>
<th>BULK CONT TYPE</th>
<th>FOOT NOTE</th>
<th>MINIMUM WEIGHT</th>
<th>RATE PER UNIT/MIN. CHARGE PER CONTAINER</th>
<th>PIVOT WEIGHT</th>
<th>RATE PER UNIT OVER PIVOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN</td>
<td></td>
<td>5</td>
<td>1</td>
<td>4735.00</td>
<td>1650</td>
<td>2.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>1</td>
<td>3305.00</td>
<td>1155</td>
<td>2.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>1</td>
<td>2220.00</td>
<td>755</td>
<td>2.87</td>
</tr>
<tr>
<td>SCR0007</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>2.40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR0300</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>2.85</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR0323</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.18</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR0477</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>2.95</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR0602</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.18</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR4010</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.37</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR4119</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.37</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR4326</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.26</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR4400</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.37</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR4435</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.37</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR8551</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.37</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR9989</td>
<td>BULK</td>
<td>-</td>
<td>45</td>
<td>3.96</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR9994</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>2.94</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SCR9995</td>
<td>BULK</td>
<td>-</td>
<td>300</td>
<td>3.37</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: *Airline Tariff Publishing Company*
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. Individual air carriers, air freight forwarders, and other shippers 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. (See the Publications section of this workbook for a listing of these companies.)

According to the preceding rate chart for an airport-to-airport special commodity shipment of cherries (SCR0477) from Oakland, California, to Tokyo, Japan, the rate is U.S. $2.95 per kilogram with a minimum shipment weight of 300 kilograms. The minimum cost to ship 300 kilograms or less of bulk cherries on this airline is U.S. $885.

Schedules--Air carriers operate regularly scheduled flights. Schedule information can be obtained directly from the air carriers, freight forwarder, and Official Airline Guides Air Cargo Guide. (OAG Cargo Guide contact information is found in the Publications section of this workbook.)

Shippers have the option of chartering a plane to carry their cargo. 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.

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.

Ocean Cargo

Ocean liner carriers also have antitrust immunity to form associations known as conferences. As conference members, ocean liner companies may act jointly to set rates and services. Members are referred to as conference carriers. Membership in a conference is on a voluntary basis and many carriers operate as independents outside the conference system. Independent carriers are free to set their own published rates and services.

Tariff--Each carrier or conference must file a tariff with the Federal Maritime Commission (FMC). Tariffs are documents specifying the rules, freight rates, and ancillary charges associated with shipping goods. Rates for forest product shipments are exempt from tariff filing requirements.

1 Weight is calculated on the actual weight (in kilograms), dimensional weight (length x width x height), or positional weight, whichever is greater.
The rules section for a marine tariff can run in the hundreds of pages. The sample on page 18 is taken from the rules section of a tariff. This information will be applied to a sample shipment of a 40-foot container of apple juice from a North Atlantic port to Rotterdam, the Netherlands. This particular rule states the definition of the container to be used in the rate section. According to section "L. (1)," the term "container" applies to containers of not fewer than 20 feet or more than 45 feet. This definition fits the sample shipment.

*Rates*—Freight rates vary depending on the commodity being shipped, its value, weight, level of service provided, and destination. Sometimes several different rates are listed for the same commodity. For example, there may be one rate for shipping citrus and a separate rate listed for oranges, grapefruit, etc. Separate rates may also be listed for intermodal shipments.

Freight rates can be obtained directly from the steamship companies or conferences, freight forwarders, NVOCCs, or by visiting the FMC tariff library. Many steamship companies and conferences publish their own tariffs which can be obtained for a fee.

Page 19 is a sample conference tariff rate page. To calculate the rate, locate the heading for "Juice, Fruit, or Vegetables N.E.S., Single Strength in Glass, Cartons or Cans" and select "Ctr," which as stated in the rules page (p. 18), is the abbreviation for a 40-foot container. To determine the applicable freight rate, bisect this line with the column marked "C" for continent. This shows that the basic rate for a 40-foot container going from the North Atlantic to the port of Rotterdam is U.S. $1,060. The column marked "terms" shows that this rate applies to "O/O" or ocean-to-ocean shipments.

*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, currency adjustment factors, bunker fuel charges, container freight station charges, terminal handling charges, and port congestion charges. Ancillary charges can be found in the rules and rate section of tariffs. Exporters or their freight forwarders should carefully read tariffs to determine the complete freight rate. 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.

Page 20 is an example of an ancillary charge that applies to the sample shipment. "Item B" shows that the bunker adjustment factor for this shipment is U.S. $80 per 40-foot container. This ancillary charge raises the cost of the shipment to U.S. $1,140. This is only one of the many ancillary charges that can affect the final rate.
Routes--Ocean liners operate on regularly scheduled routes. The *Journal of Commerce*’s "Shipcards" section lists steamship companies, their routes, and departure and arrival dates.

In addition to regularly scheduled routes, chartered vessels can be contracted to haul full shiploads or full hulls of dry or liquid bulk cargoes. Vessels can be chartered for individual trips or specified amounts of time. These charters are free from tariff filing requirements.
RULES AND REGULATIONS

RULE-2 APPLICATION OF RATES (CONTINUED)

L. PER CONTAINER RATES

(1) Where rates are published on the basis of per "container", i.e. the container size is not specified, said rates shall apply on containers of not less than 20' nor more than 45' external length subject to the following conditions regarding 45' containers.

(a) Port/Port shipments of cargo, and intermodal multi-factor shipments of cargo for which through charges are based in part on port/port portions, which are loaded into a 45' dry or temperature controlled ("TC") container, will be charged a premium of 12.5% over the per "container" or, when so specified, the per 40' container port/port rates/portions published in the tariff, except in those instances where a specific rate has been established for 45' containers.

(b) Through shipments of cargo moving under intermodal single factor rates, which are loaded into a 45' dry or TC container, and for which a specific per 45' container rate has not been established in the tariff, will be subject to a premium over per container rates applicable to 40' containers, based on the following percentages:
   (i) 8% over Point/Port or Port/Point rates
   (ii) 5% over Point/Point rates

(c) With respect to all shipments of cargo for which per container rates applicable to 40' containers are expressed in the tariff on other than a per container basis, for example, W/M, W, M, "each", such rates shall apply for shipments of said cargo in 45' containers subject to the minimum factor governing them, except in those instances where a specific minimum has been established for a 45' container.

(d) This rule 2.L applies equally for shipments of cargo moving pursuant to service contracts when such contracts do not specifically provide rates for 45' dry or "TC" containers.

(EFFECTIVE MAY 7, 1991)
NOT FOR A/C: ACL

(e) CARGO MOVING IN 20' CTRS UNDER O/O (PORT/PORT)
Cargo moving in 20' containers for which there is no specific 20' or per container rate published will be rated at 85% of the applicable 40' rate subject to a minimum charge of $1250.00 subject to all assessorial charges. Applicable assessorial charges will be those published per 20' equipment.

For explanation of abbreviations, reference marks and symbols, see pages 2/4.

Source: Rule 2L, on pp. 26, USA-North Europe Rate Agreement FMC-10
USA-NORTH EUROPE RATE AGREEMENT  
(AGREEMENT NO. 202-011241)  
TARIFF NO. FMC-10  

<table>
<thead>
<tr>
<th>Orig/Rev</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>18th Rev.</td>
<td>523</td>
</tr>
</tbody>
</table>

FROM: U.S. PORTS AND POINTS VIA SUCH PORTS  
(AS PER RULE 1)  
TO: PORTS AND POINTS IN EUROPE  
(AS PER RULE 1)

Except as otherwise provided herein, rates apply per ton of 1000 kilos or 1 cubic meter, whichever produces the greater revenue.

EFFECTIVE DATE
January 1, 1992

CORRECTION 41004

SECTION 1 - NORTH ATLANTIC

<table>
<thead>
<tr>
<th>COMMODITY DESCRIPTION</th>
<th>RATE COLUMNS</th>
<th>COMMODITY CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C) Rates Incl. Jan. 1, 1992 GRI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juice, Fruit, and/or Vegetable, including Concentrated and/or Pulp Cells: Pulp Wash, Citrus, Apple Sauce, PKD., TC (See Notes 1 &amp; 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. 18 CTR.........................</td>
<td>W O/P 297 304 - 2009.00.0111</td>
<td></td>
</tr>
<tr>
<td>To: Danish, Swedish, Norwegian Base Ports. Note 1: Coffee concentrate may be mixed with shipment at this rate and used to make up any deficit on the minimum weight.</td>
<td>W P/O - 304 - 2009.00.0121</td>
<td></td>
</tr>
<tr>
<td>Note 2: Shipments may include &quot;Citrus Oil, Cold Pressed, Not to Exceed 10% of the total weight of shipment.&quot;</td>
<td>W O/O - - 264 2009.00.0151</td>
<td></td>
</tr>
<tr>
<td>Extract, Flavoring, N.E.S., Pkd.................................</td>
<td>WM AQ 370 382 382 2009.00.0181</td>
<td></td>
</tr>
<tr>
<td>Juice, Fruit, or Vegetables N.E.S., Single Strength in Glass, Cartons or Cans (Ordinary Stowage)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20' CTR..................................</td>
<td>PC O/O 850 850 997 2009.00.0291</td>
<td></td>
</tr>
<tr>
<td>CTR......................................</td>
<td>PC O/O 1060 1125 1212 2009.00.0301</td>
<td></td>
</tr>
</tbody>
</table>

For explanation of abbreviations, reference marks and symbols, see pages 2/4.

Source: Item 2009.00.0301 USA-North Europe Rate Agreement FMC-10
ITEM B - BUNKER ADJUSTMENT FACTOR (BAF)

All shipments shall be subject to BAF as follows:

**From North Atlantic/South Atlantic/Gulf Sections**

<table>
<thead>
<tr>
<th>BUNKER ADJUSTMENT FACTOR</th>
<th>(C) EFF. MARCH 1, 1991</th>
<th>(D) (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per 20' CRT. (Except P/P)</td>
<td>(R) $40</td>
<td>(D) (R)</td>
</tr>
<tr>
<td>Per 40'/45' Ctr. (except P/P)</td>
<td>(R) $80</td>
<td>(D) (R)</td>
</tr>
<tr>
<td>Service Contracts Providing For BAF on W Basis</td>
<td>(R) $4</td>
<td>(D) (R)</td>
</tr>
<tr>
<td>Pier/Pier Cargo</td>
<td>(R) 5% on Base Ocean Freight Charges Rounded Down To Nearest Whole Dollar</td>
<td>(D) (R)</td>
</tr>
</tbody>
</table>

**From Pacific Section**

<table>
<thead>
<tr>
<th>BUNKER ADJUSTMENT FACTOR</th>
<th>(C) EFF. MARCH 1, 1991</th>
<th>(D) (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per 20' Ctr. (Except P/P)</td>
<td></td>
<td>(D) (R)</td>
</tr>
<tr>
<td>Per 40'/45' Ctr. (Except P/P)</td>
<td></td>
<td>(D) (R)</td>
</tr>
<tr>
<td>Service Contracts Providing For BAF on W Basis</td>
<td>$4</td>
<td>(D) (R)</td>
</tr>
<tr>
<td>Pier/Pier Cargo</td>
<td>5% on Base Ocean Freight Charges Rounded Down to Nearest Whole Dollar</td>
<td>(D) (R)</td>
</tr>
</tbody>
</table>

For explanation of abbreviation, reference marks and symbols, see pages 2/4.

Source: Item B, on pp.11A, USA-North Europe Rate Agreement FMC-10
Negotiations

*Independent Action*—Conference members have a right to establish their own rates, independent of the conference, as specified in the Shipping Act of 1984. This usually occurs when a shipper negotiates a lower rate with a carrier. These rates must be filed with the FMC, listed in the tariff with the regular conference rate, and made available to other shippers within 10 days of filing.

*Service Contracts*—Shippers can also form an agreement with a carrier or conference that will guarantee a minimum quantity of cargo for a specified period of time in exchange for a lower rate or better service. This agreement is known as a service contract. Once established, the contract must be filed with the FMC and made available to all similarly situated shippers or shippers with similar products, volumes, origins, and destinations.

*Loyalty Contracts*—A loyalty contract is formed when a shipper agrees to ship a minimum percentage of its cargo over a period of time in exchange for a lower rate. Although not commonly used, this could be a valuable tool when the shipper is attempting to open in a new market and is not certain of the volume to be shipped, but desires a lower rate.

*NVOCC and Shippers Association*—Non-vessel-operating common carriers (NVOCCs) and shippers associations may also offer discounted rates that have been negotiated with carriers or conferences.

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

Slight discrepancies or omissions in documentation may prevent goods from being exported, may result in the shipper not getting paid, or may even result in seizure of the goods by U.S. or foreign customs agents. Much of the documentation is routine for freight forwarders or customs brokers, but the exporter is ultimately responsible for accuracy of the documentation.

To determine what documentation is required for any given shipment, the exporter can check with the freight forwarder, importer, bank, destination country’s consulate, and USDA’s Foreign Agricultural Service. Publications like the Bureau of National Affairs’ International Trade Reporter-Export Reference Manual and Dun’s Marketing Services' Exporters’ Encyclopaedia also provide this information.

This section looks at the most commonly required documents and includes completed SAMPLE documents for a hypothetical export shipment of 1,125 cases of apple cider to the Netherlands and a cherry shipment to Japan.

Each country has different requirements regarding the documentation that accompanies a shipment. Import regulations for the Netherlands require the following documents: commercial invoice, bill of lading, and U.S. shipper’s export declaration.

The buyer/importer may require the following documents: certificate of origin, export certificate of some type, or a statement of processing methodology (depending on the level of processing involved).

Additional documents are required based on the terms of sale, method of payment, and transportation mode. For our sample shipment, these will include a pro forma invoice, packing list, certificate of insurance, dock receipt, bill of lading, and air waybill.

Other import regulations that affect this sample shipment of apple cider to the Netherlands are the European Community packaging and labeling requirements and health and phytosanitary regulations. Although only the documentation requirements will be addressed here, exporters must know
what other non-documentation regulations apply to their shipment. This information can be obtained from the Office of Food Safety and Technical Services of the USDA Foreign Agricultural Service.

**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, telex and FAX numbers
- Buyer’s name and 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

(Sample provided on p. 37.)

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. For the sample shipment, two signed copies of the commercial invoice are required. 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

Some foreign countries and importers may require a certificate attesting to the specifications of the goods shipped. The inspection is usually performed by a third party.

The USDA will inspect agricultural exports for insects and disease and issue certificates attesting to the product’s condition. These certificates facilitate exporting of U.S. agricultural products. Included among them are the Federal Phytosanitary Certificate, Export Certificate Processed Plant Products, and Certificate of Quality and Condition.

Phytosanitary Certificate--The purpose of the phytosanitary certificate is to expedite the entry of plants or plant products into a foreign country. This certificate is completed by USDA’s Animal and Plant Health Inspection Service (APHIS). (Sample provided on p. 38.)

Export Certificate--The export certificate 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. Products that fall under this category are as follows:

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 export certificate is also completed by APHIS. (Sample provided on p. 39.)

**Certificate of Quality and Condition**--USDA’s Processed Products Branch offers official inspection and grading of canned, frozen, and dehydrated fruits and vegetables, and related products. This service, and the resulting certificates, can be tailored to an exporter’s needs and is available on a fee basis. (Sample provided on p. 40.)

Other USDA inspection and certification programs, along with contact information, are listed in the Trade Assistance section of this workbook.

**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).

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. (Sample provided on p. 41.)

**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 typically produced by the exporter or the exporter’s freight forwarder and is signed by the receiving clerk for the carrier. (Sample provided on p. 42.)
**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. (Sample provided on p. 43.)

**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 purchased 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. (Sample provided on p. 44.)

**Shipper’s Export Declaration**

This section provides instruction for preparing a Shipper’s Export Declaration (SED). (Sample provided on p. 45.) The U.S. Government requires that exporters complete a SED for international shipments. It is not intended as a substitute for either the Foreign Trade Statistics Regulations or the Export Administration Regulations.

**Purpose**—The SEDs, forms 7525-V, 7525-V-Alternate (Intermodal), and 7513 (In-Transit Goods) are joint Bureau of the Census/International Trade Administration documents for compiling official U.S. export statistics and administering the requirements of the Export Administration Act. Foreign Trade Statistics Regulations (FTSR) (15 CFR, part 30) and the Export Administration Regulations (15 CFR, parts 368-399) govern the SEDs.

**Forms**—Form 7525-V, its continuation sheet, and form 7513 may be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC 20402, local customs district directors, or privately printed. Form 7525-V-Alternate (Intermodal) and its continuation sheet must be privately printed. Sample copies may be obtained from the Bureau of the Census, Washington, DC 20233.

When privately printing SEDs, the forms must conform in every respect to the official forms in size, wording, color (black ink on buff paper; except form 7513 on pink paper), weight of paper stock (not less than 16 nor more than 20 pound commercial substance), and arrangement, including the Office of Management and Budget approval number printed in the upper right-hand corner on the face of the form.

SEDs are designed to be similar to other documents so that an exporter can prepare several shipping forms at the same time. Form 7525-V aligns with the Canadian invoice, air waybills, and other vertically oriented
documents. Form 7525-V-Alternate (Intermodal) aligns with the ocean bill of lading and other horizontally oriented documents. Either form may be used regardless of the method of transportation or destination.

The Bureau of the Census permits exporters, carriers, or freight forwarders to submit monthly reports via electronic medium or summary declaration in lieu of filing individual SEDs for each shipment.

When Required--SEDs need to be filed for virtually all shipments, including hand-carried merchandise, from the U.S. (50 States and the District of Columbia); Puerto Rico; U.S. or Puerto Rican Foreign Trade Zones (FTZs); and U.S. Virgin Islands. Exemptions for shipments from the U.S., particularly if the shipment is valued at $2,500 or less, are listed later in this section. SEDs are also required to be filed for shipments between the U.S., Puerto Rico, and U.S. Virgin Islands.

SEDs are not required for U.S. or Puerto Rico shipments to or from U.S. possessions (except the U.S. Virgin Islands), and Canada.

The SED for in-transit merchandise (form 7513) is required to be filed for:

- Merchandise destined from one foreign country to another which transits the United States, Puerto Rico, or the U.S. Virgin Islands and is exported by vessel regardless of the method of transportation by which the merchandise entered. If a validated export license is required, this form must be filed regardless of the method of transportation for the export.
- Merchandise exported from general order warehouses.
- Imported merchandise that has been rejected by Government inspection and is being exported.

Number of Copies Required

- One copy for shipments to Canada, Puerto Rico, and the U.S. Virgin Islands.
- One copy for exports through the U.S. Postal Service.
- Two copies for all other shipments.

Additional copies may be required for export control purposes by the International Trade Administration, other Government agencies (when authorized), customs directors, or the Postmaster General.

Requirement for Separate SEDs--Separate SEDs are required for each shipment by one consignor on a single carrier (including each railcar, truck, or other vehicle). However, customs directors may waive this requirement if multiple car shipments are made under a single loading document and cleared simultaneously. Also, merchandise requiring a validated export license shall not be reported on the same SED with merchandise moving under general license.
**Presentation**

- Postal Shipments--SEDs shall be delivered to the Postmaster with the packages at the time of mailing.
- Pipeline shipments--SEDs shall be submitted to the customs director within 4 working days after the end of the calendar month.
- All other shipments--SEDs shall be delivered to the exporting carrier prior to exportation.
- Exporting carriers are required to file SEDs and manifests with Customs. (See sections 30.20 through 30.24 of the FTSR.)

Shipments from an interior point--The SED may accompany merchandise being transported to the exporting carrier of the port of exportation, or it may be delivered directly to the exporting carrier.

Shipments exempt from SED filing requirements--A reference to the exemption must be noted on the bill of lading, air waybill, or other loading document for verification that no SED is required.

**Corrections**

Corrections, amendments, or cancellations of data may be made directly on the SED that was originally filed if it has not been forwarded to the Bureau of the Census. If the SED has been forwarded to the Bureau, corrections, amendments, or cancellations should be made on a copy of the original SED (marked "Correction Copy") and filed with the customs director or the Postmaster where the declaration was originally presented.

**Exemptions**

- Shipments (excluding postal shipments) where the value of commodities classified under each individual Schedule B number is $2,500 or less, for which a validated export license is not required, and when shipped to countries not prohibited by the Export Administration Regulations (15 CFR, parts 368-399).
- Shipments through the U.S. Postal Service that do not require a validated license under the following conditions:
  1. The shipment is valued at $500 or less.
  2. Either the consignee or the consignor is not a business concern.
  3. The shipment is not for commercial consideration.
- In-transit shipments not requiring a validated export license and leaving for a foreign destination by means other than a vessel.
- Shipments from one point in the United States to another point thereof by routes passing through Canada or Mexico, and shipments from one point in Canada or Mexico to another point thereof by routes passing through the United States.
• Shipments to the U.S. Armed Services

1. All commodities consigned to the U.S. Armed Services, including exchange systems.
2. Department of Defense Military Assistance Program Grant-Aid shipments being transported as Department of Defense cargo.

• Shipments to U.S. Government Agencies and Employees

1. Office furniture and supplies for use in Government offices.
3. Food, medicines, and related items, and other commissary items for use by U.S. Government employees and offices.
4. Government shipments of books, charts, maps, and other items for use by libraries or similar institutions.

• Miscellaneous Exemptions

1. Diplomatic pouches and their contents.
2. Human remains and accompanying appropriate receptacles and flowers.
3. Shipments of gift parcels moving under general license GIFT.
4. Shipments of interplant correspondence and other business records from a U.S. firm to its subsidiary or affiliate.
5. Shipments of pets as baggage leaving the U.S.

Conditional Exemptions--SEDs are not required for the following items if they are not shipped as cargo under a bill of lading or air waybill, and do not require a validated export license:

• Baggage, household effects, and tools of trade of persons leaving the United States when such are owned by the person, in their possession at the time of departure, and intended for their use only.
• Carriers' stores, supplies, equipment, bunker fuel, and so forth, when not intended for unloading in a foreign country.
• Usual and reasonable kinds and quantities of dunnage necessary to secure and stow cargo (for sole use on board the carrier).

If the shipments indicated above are shipped under a bill of lading or air waybill, the SED should include a statement in the description column (in lieu of a description) that the shipment consists of baggage, personal effects, and other items mentioned as exemptions, and Schedule B commodity numbers should not be shown.

If these shipments require a validated export license, the SED must identify the shipment as baggage, personal effects, and so forth, and must contain all of the information required on the SED.
Retention of Shipping Documents--The Bureau of the Census, the International Trade Administration, and the U.S. Customs Service may require exporters or their agents to produce copies of shipping documents within 3 years of exportation.

Administrative Provisions--SEDs are confidential and used solely for official purposes authorized by the Secretary of Commerce in accordance with 13 U.S.C. section 301(g). Information in the SEDs may not be disclosed to anyone except the exporter or agent involved.

Information from SEDs (except common information) may not be copied on manifests or other shipping documents. Exporters may not furnish SEDs or their information to anyone for unofficial purposes.

Copies of the SEDs may be supplied to exporters or their agents when such copies are needed to comply with official requirements as authorization for export, export control requirements, or U.S. Department of Agriculture requirements for proof of export in connection with subsidy payments. Such copies will be stamped certified and not for any other use, and may not be reproduced in any form.

When the Secretary of Commerce or delegate determines that the withholding of information provided on an individual SED is contrary to the "national interest," the Secretary or delegate may make such information available, taking safeguards and precautions as deemed appropriate.

A SED presented for export constitutes a representation by the exporter that all statements and information are in accordance with export control regulations. The commodity described on the declaration is authorized under the particular license as identified on the declaration, all statements conform to the applicable licenses, and all conditions of the export control regulations have been met.

It is unlawful to knowingly make false or misleading representation for exportation. This constitutes a violation of the Export Administration Act, 50. U.S.C. app. 2410. It is also a violation of export control laws and regulations to be connected in any way with an altered SED to effect export.

Commodities exported in violation of the Export Administration Act are subject to seizure, detention, condemnation, or sale under 22 U.S.C. section 401. Similarly, commodities for which there is probable cause to believe that the intent is to export them in violation of the Act may also be seized, detained, condemned or sold under 22 U.S.C. section 401.

To knowingly make false or misleading statements relating to information on the SED is a criminal offense subject to penalties as provided for in 18 U.S.C. section 1001.
Violations of the Foreign Trade Statistics Regulations are subject to civil penalties as authorized by 13 U.S.C. section 305.

**Regulations**—Detailed information regarding the SED and its preparation is contained in the Foreign Trade Statistics Regulations (FTSR) (15 CFR, Part 30). Also, the FTSR should be consulted for special provisions applicable under particular circumstances. Copies may be purchased from the Bureau of the Census, Washington, DC 20233. Information concerning export control laws and regulations of the International Trade Administration is contained in the Export Administration Regulations, which may be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC 20402.

**Reference Schedules**


Schedule C—Classification of Country and Territory Designations for U.S. Foreign Trade. Free from the Bureau of the Census, Washington, DC 20233. Also included as part of Schedule B and USTSA.

Schedule D—Classification of Customs Districts and Ports. Free from the Bureau of the Census, Washington, DC 20233. Also included as part of Schedule B and USTSA.

Schedule K—Classification of Foreign Ports by Geographic Trade Area and Country. Free from the Bureau of the Census, Washington, DC 20233.

Foreign Trade Statistics Regulations. For sale by the Bureau of the Census, Washington, DC 20233.


**Preparation**

The SED shall be prepared in English in a permanent medium with the original signed (signature stamp acceptable) by the exporter or the duly authorized agent. The agent's authority to sign the SED must be executed by a power of attorney or as authorized on the SED.
Export Licensing

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

There are two types of export licenses: general licenses and validated licenses. Licenses are given for transactions, not for individuals or companies. Except for U.S. territories and possessions, and in most cases Canada, all items exported require an export license.

General License--A general license is a broad grant of authority by the Government to all exporters for certain categories of products. There is no application process for a General License. Agricultural products usually qualify for this type of license.

Validated License--A validated license is a specific grant of authority from the Government to a particular exporter to export a particular product. This license is granted on a case-by-case basis for either a single transaction or for a specified period of time. An exporter must apply for a validated export license.

To comply with export licensing regulations, the exporter needs to determine whether the product being exported requires a general or a validated license. Determining which license is needed is based on two factors:

1. What is being exported? The Government restricts exportation of some products for reasons of national security, foreign policy, or short supply. Rarely are exports of products that fall under the jurisdiction of the U.S. Department of Agriculture restricted for these reasons.
2. What is the product's destination? Are there any trade restrictions on products going to the destination? U.S. Government policy restricts trade with some countries. Exporting to a country with trade restrictions is either prohibited or would require a validated export license. Currently, there are trade embargoes on exports to Iraq, Iran, Cuba, Libya, Haiti, Vietnam, Serbia, Montenegro, and North Korea. This is the main reason agricultural products would require a validated license.

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, (202) 622-2480 or (202) 622-2500.

Now that the exporter has determined that there are no restrictions on exporting the product to the destination country, there is no need to apply
for a license. Agricultural exporters use a general license and type "G-DEST" when requested for the general license symbol on the shipper's export declaration.

Although most agricultural shipments are exported using a general license, 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 license.

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 Department of the Treasury's Bureau of Alcohol, Tobacco, and Firearms. (See Trade Assistance section of this workbook for contact information.) Many States also have rules and regulations governing exports. The local State 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. Page 48 lists the commodity classifications for selected fresh fruits, nuts, and vegetables to be used by shippers in reporting export shipments from the United States. The lists are reproduced from the Department of Commerce publication: Schedule B--Statistical Classification of Domestic and Foreign Commodities Exported from the United States, volumes 1 and 2, 1988. The lists are not comprehensive. To obtain code numbers that are not listed, contact the Bureau of the Census, Foreign Trade Division, Food, Animal, and Wood Section, Washington, DC 20233, (301) 763-5891.

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.

### Approximate Metric Conversion Factors

<table>
<thead>
<tr>
<th>When You Know Number Of</th>
<th>Multiply By</th>
<th>To Find The Number Of</th>
</tr>
</thead>
<tbody>
<tr>
<td>pounds (lb)</td>
<td>0.4536</td>
<td>kilograms (kg)</td>
</tr>
<tr>
<td>long tons (lt)</td>
<td>1.016</td>
<td>metric tons (t)</td>
</tr>
<tr>
<td>short tons (st)</td>
<td>0.907</td>
<td>metric tons (t)</td>
</tr>
</tbody>
</table>
### Bill of Lading

Bills of lading are contracts between the owner of the goods and the carriers. There are two types:

- "Straight" bills of lading that are non-negotiable.
- "Shipper's order" or negotiable bills of lading that can be bought, sold, or traded while goods are in transit, and can be used for letter of credit transactions.

The customer usually needs the original or a copy as proof of ownership to take possession of the goods. The bill of lading is issued by the steamship line. (Sample provided on p. 46.)

### 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. (Sample provided on p. 47.)
# Sample Transport Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro Forma Invoice/Commercial Invoice</td>
<td>37</td>
</tr>
<tr>
<td>Phytosanitary Certificate</td>
<td>38</td>
</tr>
<tr>
<td>Export Certificate</td>
<td>39</td>
</tr>
<tr>
<td>Certificate of Quality and Condition</td>
<td>40</td>
</tr>
<tr>
<td>Packing List</td>
<td>41</td>
</tr>
<tr>
<td>Dock Receipt</td>
<td>42</td>
</tr>
<tr>
<td>Certificate of Origin</td>
<td>43</td>
</tr>
<tr>
<td>Insurance Certificate</td>
<td>44</td>
</tr>
<tr>
<td>Shipper's Export Declaration</td>
<td>45</td>
</tr>
<tr>
<td>Bill of Lading</td>
<td>46</td>
</tr>
<tr>
<td>Air Waybill</td>
<td>47</td>
</tr>
<tr>
<td>Harmonized Tariff Schedule</td>
<td>48</td>
</tr>
</tbody>
</table>
John Doe Orchard Produce Inc.
1234 Main Street
Frederick, Maryland 45678
Telephone 202-363-5646
Fax 202-363-2753

Sample Pro Forma Invoice

Cust #: 12
Sold To: DEMCO IMPORT CO. B.V.
Pannerstraat 87
Rotterdam, Netherlands

We hereby quote as follows:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Unit Price</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>1125 Cases</td>
<td>Containing 4 Gallons (3.75 Liters) each of apple cider</td>
<td>$6.25</td>
<td>$7,031.25</td>
</tr>
</tbody>
</table>

Total FOB Frederick, MD Domestic packed $7,031.25
Export processing, packaging, prepaid inland freight to Baltimore $375.00
Forwarder’s handling charges $110.00
Ocean freight charges and insurance $3,017.78
CIF Rotterdam, Netherlands $10,534.03

Gross Weight 54,000 lbs.
Export Packed 24,500 kg.
Cube 1,687 cu. ft.

1) All prices quoted herein are U.S. dollars.
2) Prices quoted herein for merchandise only are valid for 60 days from this date.
3) Any changes in shipping costs or insurance rates are for account of the Buyer.
4) We estimate Ex-Factory shipment approximately 60 days from receipt here of purchase order and letter of credit.

Source: Overseas Shipping Co.
No phytosanitary certificate can be issued until an application is completed (7 CFR 353).

UNITED STATES DEPARTMENT OF AGRICULTURE

ANIMAL AND PLANT HEALTH INSPECTION SERVICE

PLANT PROTECTION AND QUARANTINE

PHYTOSANITARY CERTIFICATE

TO: THE PLANT PROTECTION ORGANIZATION(S) OF:

Date & No.: B

Date Inspected:

This is to certify that the plants 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 importing country.

DISINFESTATION AND/OR DISINFECTION TREATMENT

Date: ____________________________________________ Treatment: __________________________

Chemical (active ingredient): ___________________________ Duration and Temperature: ___________________________

Concentration: ___________________________ Additional Information: ___________________________

DESCRIPTION OF THE CONSIGNMENT

Name and address of the exporter: _____________________________________________________________

Declared name and address of the consignee: ___________________________________________________

Name of produce and quantity declared: _______________________________________________________

Botanical name of plants: ________________________________________________________________

Number and description of packages: _______________________________________________________

Distinguishing marks: ________________________________________________________________

Place of origin: ______________________________________________________________

Declared means of conveyance: ___________________________ Declared point of entry: ___________________________

ADDITIONAL DECLARATION

Name of Authorized Officer

(Signature)

Source: USDA Animal And Plant Health Inspection Service
<table>
<thead>
<tr>
<th>PLACE:</th>
<th>DATE:</th>
<th>NUMBER:</th>
<th>P</th>
</tr>
</thead>
</table>

**NAME AND ADDRESS OF EXPORTER**

**NAME AND ADDRESS OF CONSIGNEE**

**MEANS OF CONVEYANCE**

**POINT OF ENTRY**

**DESCRIPTION OF CONSIGNMENT**

**PRODUCT (Name, Quantity, and Weight)**

**IDENIFICATION**

**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.

**Source: USDA Animal And Plant Health Inspection Service**
United States Department of Agriculture
Agricultural Marketing Service

Certificate of Quality and Condition
(Processed Foods)

Please refer to this certificate by number and inspection office.

<table>
<thead>
<tr>
<th>Number</th>
<th>August</th>
<th>Attachment</th>
</tr>
</thead>
<tbody>
<tr>
<td>165-A-41</td>
<td>1987</td>
<td>2</td>
</tr>
</tbody>
</table>

The certificate is reserved in all courts of the United States as prima facie evidence of the truth of the statements herein contained. It does not excuse failure to comply with any applicable Federal or State laws. WARNING: Any person who knowingly falsely makes, issues, forges, or counterfeits this certificate, or participates 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 (7 U.S.C. 1622(b)).

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.

<table>
<thead>
<tr>
<th>Date</th>
<th>August 5, 1987</th>
</tr>
</thead>
</table>

Applicant: ABC Frozen Foods
Address: Portland, Oregon

Receiver or Buyer: London, England
Address: ----

Source of Samples: Submitted by Applicant

Product Inspected: Frozen Whole Kernel Corn

Code Marks on Containers: T34, T36

Principal Label Marks:
Frozen cut corn net weight 10 ounces. Distributed by Major, Inc.
Sacramento, California 92210.

Net Weight: 10.0 and 10.2 ounces
Color: Golden (or yellowish)

U. S. Grade C or U. S. Standard
Score: 75 points each

Certificate Restricted: Sample submitted by applicant and does not officially represent any lot.

Remarks:
This certificate covers 2 - 10 ounce sample units.

Source: USDA Agricultural Marketing Service
JOHN DOE ORCHARD PRODUCE INC.
1234 MAIN STREET
FREDERICK, MARYLAND  45678
Telephone 202-363-5646
Fax 202-363-2753

SAMPLE PACKING LIST

To: DEMCO IMPORT CO. B.V.  
Pannerstraat 87
Rotterdam, Netherlands

Under your Order No. _RJ 4935_____ the material listed below was shipped 2/24/92
via TRUCK AND VESSEL
To ROTTERDAM

<table>
<thead>
<tr>
<th>Shipment consists of:</th>
<th>Marks:</th>
</tr>
</thead>
</table>
| 1125 Cases           | DEMCO IMPORT CO. B.V.  
ROTTERDAM NETHERLANDS  
MADE IN USA  
#1/1125 |

*Legal weight is weight of article plus paper, box, bottle, etc., contains the article as usually carried in stock.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Weights in LBS. or KILOS</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1125 Cases</td>
<td>Containing 4 Gallons (3.75 Liters) each of apple cider</td>
<td>48 lbs.</td>
<td>12&quot; 12&quot; 18&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54,000 lbs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24,500 kg.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Overseas Shipping Co.
**SHIPPER/EXPORTER**

JOHN DOE ORCHARD PRODUCE INC
1234 MAIN STREET
FREDERICK, MARYLAND 45678

**DOCK RECEIPT**

**DOCUMENT NO.**

BAL 32118

**SHIPPER'S REF. NO.**

**FORWARDER REF. NO.**

RJ 4935

**FORWARDING AGENT P.M.O. NO.**

688

HARRY SMITH FORWARDING CO
WELD TRADE BLDG
BALTIMORE, MD 21201

**PLACE OF DELIVERY**

FANNERSTRAAT 87

**SHED 10 DUNDALK MARINE TERMINAL**

**EXPERTISE CARRIER**

ATLANTIC SONG
Baltimore, MD

**PORT OF DISCHARGE**

ROTTERDAM

**PLACE OF DELIVERY**

**FOR TRANSHIPMENT TO**

**PARTICULARS FURNISHED BY SHIPPER**

**MARKS AND NUMBERS**

ACLU 3231132/3

**NO. OF PKGS.**

1

**DESCRIPTION OF PARCELS AND GOODS**

1120 CANS APPLE CIDER

**GROSS WEIGHT**

245000 KG.

**MEASUREMENTS**

1687 CBT

**THESE COMMODITIES LICENSED BY US FOR ULTIMATE DESTINATION: THE NETHERLANDS DIVERSION CONTRARY TO U.S. LAW PROHIBITED**

**DELIVERED BY:**

RAIL

LIGHTER

TRUCK

**ARRIVED—DATE.**

**TIME.**

**UNLOADED—DATE.**

**TIME.**

**CHECKED BY.**

**PLACED IN SHIP ON DOCK LOCATION**

**CONTAINER NO.(S).**

00662

**RECEIVING CLERK**

**DATE.**

Source: Overseas Shipping Co.
CERTIFICATE OF ORIGIN

2. EXPORTER (Principal or seller-licensee and address including ZIP Code)
JOHN DOE ORCHARD PRODUCE INC
1234 MAIN STREET
FREDERICK, MARYLAND 45678

3. CONSIGNEE TO
DEMOCO IMPORT CO.B.V.
PANNERSTRAAT 87
ROTTERDAM
THE NETHERLANDS

4. NOTIFY PARTY/INTERMEDIATE CONSIGNEE (Name and address)
SAME AS ABOVE

5. DOCUMENT NUMBER
BAL32118

5a. B/L OR AWB NUMBER
VCL9927

6. EXPORT REFERENCES
JOHN DOE ORCHARD PRODUCE INC
RJ4935

7. FORWARDING AGENT (Name and address - references)
HARRY SMITH FORWARDING CO.
WORLD TRADE BLDG
BALTIMORE, MD 21201

8. POINT (STATE) OF ORIGIN OR FTZ NUMBER
FREDERICK MD

9. DOMESTIC ROUTING/EXPORT INSTRUCTIONS
FREDERICK MD TO PORT OF BALTIMORE, MARYLAND

10. LOADING PIER/TERMINAL
SHED 10-DUNDALK MARINE TERMINAL

11. TYPE OF MOVE
CONTAINER

11a. CONTAINERIZED (Vessel only)
B Yes
D No

12. MARKS AND NUMBERS
ACLU 3231132/3

13. PLACE OF RECEIPT BY PRE-CARRIER
BALTIMORE, MD

14. PLACE OF DELIVERY BY ON-CARRIER
BALTIMORE, MD

15. EXPORTING CARRIER
ATLANTIC SONG ACL

16. FOREIGN PORT OF UNLOADING (Vessel and air only)
ROTTERDAM, THE NETHERLANDS

12. COMMODITIES LICENSED BY U.S. FOR ULTIMATE DESTINATION: THE NETHERLANDS
DIVERSION CONTRARY TO U.S. LAW PROHIBITED

The undersigned, (Owner or Agent), does hereby declare for the above name shipper, the goods as described above were shipped on the above date and consigned as indicated and are products of the United States of America Dated at BALTIMORE, MD on the 15 day of FEBRUARY 1992

Sworn to before me this 15 day of FEBRUARY 1992

The BALTIMORE CHAMBER OF COMMERCE, a recognized Chamber of Commerce under the laws of the State of MARYLAND, has examined the manufacturer's invoice or shipper's affidavit concerning the origin of the merchandise, and, according to the best of its knowledge and belief, finds that the products named originated in the United States of North America.

Source: Overseas Shipping Co.
FIREMAN'S FUND INSURANCE COMPANY
SAN FRANCISCO, CALIFORNIA
ATLANTIC DIVISION, 110 WILLIAM STREET
NEW YORK, NEW YORK 10038

ASSURED: JOHN DOE ORCHARD PRODUCE INC & DEMCO IMPORT CO.B.V.

OP No. 414

10,534.00

IN THE SUM OF:

$ TEN THOUSAND FIVE HUNDRED THIRTY FOUR DOLLARS

UPON:

ONE 40 CONTAINER S.T.C.

1125 CASES APPLE CIDER

VALUED AT SUM OR SUMS INSURED.

LADEN UNDER (DECK) ON BOARD THE VESSEL LAINE

ATLANTING SONG - ACL

BL OR SAILING DATE: 02-15-92

LOST OR NOT LOST AT AND FROM (INITIAL POINT/PORT)

FREDERICK, MARYLAND

Baltimore, MD

TO (FINAL POINT/PORT)

Rotterdam

The Netherlands

LOSS, IF ANY, PAYABLE TO THE ORDER OF THE ASSURED.

Insured against all risks of physical loss or damage from any external cause in-cluding the reverse side of this policy, except to the extent that such risks may be specifically covered by endorsement; also war risks (flying bombs, etc.) and all other risks except those specifically excluded by the F.C.C. and/or^ any other endorsement on the reverse side of this policy.

This Insurance attaches from the time the goods leave the warehouse at the place named in the policy to the corner of the vessel and continues until the goods are landed or the loss known or expected, to the nearest agent of this Company as designated on the reverse side hereof.

This Insurance is subject to the American Institute Cargo Clauses (A.I.C.C.) and the following American Institute Clauses as 11 the current forms of each endorsement hereon:

War Risk Insurance

South America Clauses

44

Risks of war

Issued in original and duplicate, one of which shall be accomplished, the other to be void.

Source: Overseas Shipping Co.
## SHIPPER'S EXPORT DECLARATION

**FORM 7525-V-ALT. (Intermodal)**

**U.S. DEPARTMENT OF COMMERCE - BUREAU OF THE CENSUS - INTERNATIONAL TRADE ADMINISTRATION**

**SHIPPERS EXPORT DECLARATION**

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
</table>
| 2. EXPORTER | JOHN DOE ORCHARD PRODUCE INC  
1234 MAIN STREET  
FREDERICK, MARYLAND 45678 |
| 8. DOMESTIC ROUTING/EXIT INSTRUCTIONS | FREDERICK MD TO PORT OF EXIT: BALTIMORE MD |
| 24. SCHEDULE B NO. | 22206.00.1500 |
| 25. VALUE | 1125 CASES AFTER CLOSING |
| 22. VALIDATED LICENSE NO./GENERAL LICENSE SYMBOL | G-DEST |
| 9. DOCUMENT NUMBER | BAL 32118 |
| 0. OMB No. 0607-0152 |
| 21. EXPORT SHIPMENT | 0107 KGRS.1687 CPT |

**SAMPLE**

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACLU 3231132/3</td>
<td>1</td>
</tr>
<tr>
<td>40 FOOT CONTAINER</td>
<td>1</td>
</tr>
<tr>
<td>1125 CASES</td>
<td>2</td>
</tr>
</tbody>
</table>

---

**NOTICE:**

- The information provided is for official purposes only.
- The form is designed to support the tracking and regulation of international trade.
- All entries must be accurate and complete to facilitate proper documentation and compliance with trade regulations.
- Any falsification or misrepresentation may lead to legal consequences.

---

**Source:** Overseas Shipping Co.
BILL OF LADING

SHIPPER/EXPORTER (COMPLETE NAME AND ADDRESS):
JOHN DOE ORCHARD PRODUCE INC
1234 MAIN STREET
FREDERICK, MARYLAND 45678

BOOKING NO.:
BAL 32118

EXPORT REFERENCES:
JOHN DOE ORCHARD PRODUCE INC.
RJ 4935

CONSIGNEE (COMPLETE NAME AND ADDRESS):
DEMCO IMPORT CO. B.V
PANNERSTRAAT 87
ROTTERDAM
THE NETHERLANDS

NOTIFY (COMPLETE NAME AND ADDRESS):
SAME AS ABOVE

BILL OF LADING NO
ACL 9927

1234 MAIN STREET
FREDERICK, MARYLAND 45678

PLACE OF RECEIPT:
BALTIMORE, MD

VESEL:
ATLANTIC SONG

LOADING PIER/Terminal:
SHED 10-DUNDALE MARINE TERMINAL

PORT OF ORIGIN OF GOODS:
FREDERICK, MD
USA

NOTIFY (COMPLETE NAME AND ADDRESS):
SAME AS ABOVE

ALSO NOTIFY:
DEMCO IMPORT CO. B.V.
ROTTERDAM, THE NETHERLANDS

PLACE OF DELIVERY:
ROTTERDAM

CONTAINER/WHSE:

Washington, D.C. USA and with the Canadian Transport Commission, Ottawa, Ont., Canada, such tariffs also being available from any port agent listed on the reverse side hereof. In accepting this bill of lading the merchant agrees to be bound by its terms and conditions. In witness hereof, one original bill of lading has been signed and accepted, one of which being accomplished the receipts to be void.

By:

Source: Overseas Shipping Co.
**Shippers Name and Address**
John Doe Orchard Produce Inc
1234 Main Street
Frederick, Maryland 45678

**Consignee's Name and Address**
Demco Import Co., B.V.
Pannerstraat 87
Rotterdam
The Netherlands

**Issuing Carrier's Agent Name and City**
Pilot Express Inc
Baltimore, MD 21202

**Accounting Information**
All charges to be paid by Pilot Express Inc

**Airport of Departure (Airline of First Carrier) and Requested Routing**
BWI

**Handling Information**
These commodities are licensed by the United States for ultimate destination. NE: Bermuda. Exports contrary to United States law prohibited.

**Sample**

<table>
<thead>
<tr>
<th>No. of container</th>
<th>Weight (LBS)</th>
<th>Rate Class</th>
<th>Rate/Charge</th>
<th>Gross/Net</th>
<th>Other Charges</th>
<th>Total Other Charges</th>
<th>Valuation Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>12 KGS</td>
<td>0809</td>
<td>810.00</td>
<td>832.80</td>
<td>22.80</td>
<td>70.00</td>
<td></td>
</tr>
</tbody>
</table>

**Vendor Certifies**

---

Source: Overseas Shipping Co.
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Schedule B Number</th>
<th>Check Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>0808.10.0000</td>
<td>2</td>
</tr>
<tr>
<td>Apricots</td>
<td>0809.10.0000</td>
<td>9</td>
</tr>
<tr>
<td>Artichokes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese Artichokes</td>
<td>0706.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Globe Artichokes</td>
<td>0709.10.0000</td>
<td>2</td>
</tr>
<tr>
<td>Jerusalem Artichokes</td>
<td>0714.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Asparagus</td>
<td>0709.20.0000</td>
<td>0</td>
</tr>
<tr>
<td>Avocados</td>
<td>0804.40.0000</td>
<td>0</td>
</tr>
<tr>
<td>Bamboo Shoots</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Bananas, Plantains</td>
<td>0803.00.0000</td>
<td>9</td>
</tr>
<tr>
<td>Beans:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wax, Kidney, Lima, String, Mung, French, Runner, Butter</td>
<td>0708.20.0000</td>
<td>1</td>
</tr>
<tr>
<td>Cowpeas</td>
<td>0708.20.0000</td>
<td>1</td>
</tr>
<tr>
<td>Broad Beans</td>
<td>0708.90.0000</td>
<td>6</td>
</tr>
<tr>
<td>Lentils</td>
<td>0708.90.0000</td>
<td>6</td>
</tr>
<tr>
<td>Horse Beans</td>
<td>0708.90.0000</td>
<td>6</td>
</tr>
<tr>
<td>Hyacinth Beans</td>
<td>0708.90.0000</td>
<td>6</td>
</tr>
<tr>
<td>Beets (Salad Beets)</td>
<td>0706.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Berries:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilberries</td>
<td>0810.40.0050</td>
<td>1</td>
</tr>
<tr>
<td>Blackberries</td>
<td>0810.20.0000</td>
<td>6</td>
</tr>
<tr>
<td>Blueberries</td>
<td>0810.40.0020</td>
<td>8</td>
</tr>
<tr>
<td>Boysenberries</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Cranberries</td>
<td>0810.40.0050</td>
<td>1</td>
</tr>
<tr>
<td>Elderberries</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Gooseberries</td>
<td>0810.30.0000</td>
<td>4</td>
</tr>
<tr>
<td>Loganberries</td>
<td>0810.20.0000</td>
<td>6</td>
</tr>
<tr>
<td>Mulberries</td>
<td>0810.20.0000</td>
<td>6</td>
</tr>
<tr>
<td>Myrtle Berries</td>
<td>0810.40.0050</td>
<td>1</td>
</tr>
<tr>
<td>Naseberries</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Raspberries</td>
<td>0810.20.0000</td>
<td>6</td>
</tr>
<tr>
<td>Rowan Berries</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Strawberries</td>
<td>0810.10.0000</td>
<td>8</td>
</tr>
<tr>
<td>Broccoli:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headed Broccoli</td>
<td>0704.10.0000</td>
<td>7</td>
</tr>
<tr>
<td>Sprouting Broccoli</td>
<td>0704.90.4020</td>
<td>8</td>
</tr>
<tr>
<td>Brussel Sprouts</td>
<td>0704.20.0000</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Transportation Facts
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Schedule B Number</th>
<th>Check Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cabbage:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese Cabbage</td>
<td>0704.90.2000</td>
<td>6</td>
</tr>
<tr>
<td>Red Cabbage</td>
<td>0704.90.2000</td>
<td>6</td>
</tr>
<tr>
<td>Savoy Cabbage</td>
<td>0704.90.2000</td>
<td>6</td>
</tr>
<tr>
<td>White Cabbage</td>
<td>0704.90.2000</td>
<td>6</td>
</tr>
<tr>
<td>Capers</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Carrots</td>
<td>0706.10.3000</td>
<td>9</td>
</tr>
<tr>
<td>Cassava (Manioc)</td>
<td>0714.10.0000</td>
<td>5</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>0704.10.0000</td>
<td>7</td>
</tr>
<tr>
<td>Celeriac</td>
<td>0706.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Celery</td>
<td>0709.40.0000</td>
<td>6</td>
</tr>
<tr>
<td>Chard</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td><strong>Cherries:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweet Varieties</td>
<td>0809.20.0020</td>
<td>5</td>
</tr>
<tr>
<td>Tart Varieties</td>
<td>0809.20.0040</td>
<td>1</td>
</tr>
<tr>
<td>Chervil</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td><strong>Chicory:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endive (Curly) Chicory</td>
<td>0705.29.0000</td>
<td>5</td>
</tr>
<tr>
<td>Escarole Chicory</td>
<td>0705.29.0000</td>
<td>5</td>
</tr>
<tr>
<td>Witloof Chicory</td>
<td>0705.21.0000</td>
<td>3</td>
</tr>
<tr>
<td>Chives</td>
<td>0703.90.0000</td>
<td>1</td>
</tr>
<tr>
<td><strong>Citrus:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citrons (Ethrog)</td>
<td>0805.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Clementines</td>
<td>0805.20.0040</td>
<td>5</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>0805.40.0000</td>
<td>9</td>
</tr>
<tr>
<td>Lemons</td>
<td>0805.30.2000</td>
<td>7</td>
</tr>
<tr>
<td>Limes (viz., Key Lime)</td>
<td>0805.30.4000</td>
<td>3</td>
</tr>
<tr>
<td>Mandarins</td>
<td>0805.20.0040</td>
<td>5</td>
</tr>
<tr>
<td>Navel Oranges</td>
<td>0805.10.0040</td>
<td>7</td>
</tr>
<tr>
<td>Pomelos</td>
<td>0805.40.0000</td>
<td>9</td>
</tr>
<tr>
<td>Satsumas</td>
<td>0805.20.0040</td>
<td>5</td>
</tr>
<tr>
<td>Temple Oranges (Royal Mandarin)</td>
<td>0805.10.0020</td>
<td>1</td>
</tr>
<tr>
<td>Tangerines</td>
<td>0805.20.0020</td>
<td>9</td>
</tr>
<tr>
<td>Valencia Oranges</td>
<td>0805.10.0040</td>
<td>7</td>
</tr>
<tr>
<td>Wilkings</td>
<td>0805.20.0040</td>
<td>5</td>
</tr>
<tr>
<td>Collards</td>
<td>0704.90.4040</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: *Transportation Facts*
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Schedule B Number</th>
<th>Check Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coriander</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Corn, Sweet</td>
<td>0709.90.4070</td>
<td></td>
</tr>
<tr>
<td>Cress (Watercress)</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Cucumbers, Gherkins</td>
<td>0707.00.0000</td>
<td>6</td>
</tr>
<tr>
<td>Currants:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dried</td>
<td>0806.20.0000</td>
<td>2</td>
</tr>
<tr>
<td>Fresh</td>
<td>0810.90.0000</td>
<td>4</td>
</tr>
<tr>
<td>Dasheens (Taros)</td>
<td>0714.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Dates</td>
<td>0804.10.0000</td>
<td>6</td>
</tr>
<tr>
<td>Dill</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Eggplants (Aubergines)</td>
<td>0709.30.0000</td>
<td>8</td>
</tr>
<tr>
<td>Fennel</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Figs</td>
<td>0804.20.0000</td>
<td>4</td>
</tr>
<tr>
<td>Garlic</td>
<td>0703.20.0000</td>
<td></td>
</tr>
<tr>
<td>Grapes (fresh)</td>
<td>0806.10.0000</td>
<td>4</td>
</tr>
<tr>
<td>Guavas</td>
<td>0804.50.0000</td>
<td>7</td>
</tr>
<tr>
<td>Horseradish</td>
<td>0706.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Jujubes</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Kale</td>
<td>0704.90.4040</td>
<td>4</td>
</tr>
<tr>
<td>Kiwi Fruit</td>
<td>0810.90.2060</td>
<td>4</td>
</tr>
<tr>
<td>Kohlrabi</td>
<td>0704.90.4040</td>
<td>4</td>
</tr>
<tr>
<td>Kumquats</td>
<td>0805.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Lettuce:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Lettuce</td>
<td>0705.11.0000</td>
<td>5</td>
</tr>
<tr>
<td>Other Lettuce</td>
<td>0705.19.0000</td>
<td>7</td>
</tr>
<tr>
<td>Litchi</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Longans</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Mangoes, Mangosteens</td>
<td>0804.50.0000</td>
<td>7</td>
</tr>
<tr>
<td>Marrows</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Medlars</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Melons:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cantaloupes</td>
<td>0807.10.1500</td>
<td>6</td>
</tr>
<tr>
<td>Casaba Melons</td>
<td>0807.10.9000</td>
<td>4</td>
</tr>
<tr>
<td>Honeydew Melons</td>
<td>0807.10.9000</td>
<td>4</td>
</tr>
<tr>
<td>Watermelons</td>
<td>0807.10.3500</td>
<td>2</td>
</tr>
<tr>
<td>Other Melons</td>
<td>0807.10.9000</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: *Transportation Facts*
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Schedule B Number</th>
<th>Check Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mushrooms</td>
<td>0709.51.0000</td>
<td>2</td>
</tr>
<tr>
<td>Mustard Greens</td>
<td>0704.90.4040</td>
<td>4</td>
</tr>
<tr>
<td>Nectarines</td>
<td>0809.30.0000</td>
<td>7</td>
</tr>
<tr>
<td>Nuts:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almonds:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Shell</td>
<td>0802.11.0000</td>
<td>7</td>
</tr>
<tr>
<td>Shelled</td>
<td>0802.12.0000</td>
<td>6</td>
</tr>
<tr>
<td>Brazil Nuts</td>
<td>0801.20.0000</td>
<td>7</td>
</tr>
<tr>
<td>Cashew Nuts</td>
<td>0810.30.0000</td>
<td>5</td>
</tr>
<tr>
<td>Chestnuts</td>
<td>0802.40.0000</td>
<td>2</td>
</tr>
<tr>
<td>Coconuts</td>
<td>0801.10.0000</td>
<td>9</td>
</tr>
<tr>
<td>Hazelnuts (or Filberts):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Shell</td>
<td>0802.21.0000</td>
<td>5</td>
</tr>
<tr>
<td>Shelled</td>
<td>0802.22.0000</td>
<td>4</td>
</tr>
<tr>
<td>Pecans:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Shell</td>
<td>0802.90.1000</td>
<td>9</td>
</tr>
<tr>
<td>Shelled</td>
<td>0802.90.1500</td>
<td>4</td>
</tr>
<tr>
<td>Pistachios:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Shell</td>
<td>0802.50.2000</td>
<td>5</td>
</tr>
<tr>
<td>Shelled</td>
<td>0802.50.4000</td>
<td>1</td>
</tr>
<tr>
<td>Walnuts:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Shell</td>
<td>0802.31.0000</td>
<td>3</td>
</tr>
<tr>
<td>Shelled</td>
<td>0802.32.0000</td>
<td>2</td>
</tr>
<tr>
<td>Okra</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Olives</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Onions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leeks</td>
<td>0703.90.0000</td>
<td>1</td>
</tr>
<tr>
<td>Onions</td>
<td>0703.10.5000</td>
<td>7</td>
</tr>
<tr>
<td>Shallots (Green Onions)</td>
<td>0703.10.5000</td>
<td>7</td>
</tr>
<tr>
<td>Onion sets</td>
<td>0703.10.2000</td>
<td>4</td>
</tr>
<tr>
<td>Pawpaws</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Papayas</td>
<td>0807.20.0000</td>
<td>1</td>
</tr>
<tr>
<td>Parsley</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Parsnips</td>
<td>0706.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Peaches</td>
<td>0809.30.0000</td>
<td>7</td>
</tr>
<tr>
<td>Pears</td>
<td>0808.20.0000</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: *Transportation Facts*
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Schedule B Number</th>
<th>Check Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackeye</td>
<td>0708.20.0000</td>
<td>1</td>
</tr>
<tr>
<td>Chick Peas (Garbanzos)</td>
<td>0708.90.0000</td>
<td>6</td>
</tr>
<tr>
<td>Green, or Podder</td>
<td>0708.10.0000</td>
<td>3</td>
</tr>
<tr>
<td>Peas:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Sweet, Bell, Chillies, Cayenne, Paprika, Jamaica)</td>
<td>0709.60.0000</td>
<td>1</td>
</tr>
<tr>
<td>Persimmons</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Peppers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pineapples</td>
<td>0804.30.0000</td>
<td>2</td>
</tr>
<tr>
<td>Plums, Sloes</td>
<td>0809.40.0000</td>
<td>5</td>
</tr>
<tr>
<td>Pomegranates</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Potatoes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Potatoes</td>
<td>0701.90.0000</td>
<td>3</td>
</tr>
<tr>
<td>Seed Potatoes</td>
<td>0701.10.0000</td>
<td>0</td>
</tr>
<tr>
<td>Sweet Potatoes</td>
<td>0714.20.0000</td>
<td>3</td>
</tr>
<tr>
<td>White, Irish</td>
<td>0701.90.0000</td>
<td>3</td>
</tr>
<tr>
<td>Yams</td>
<td>0714.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Prickly Pear</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Pumpkins</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Quinces</td>
<td>0808.20.0000</td>
<td>0</td>
</tr>
<tr>
<td>Radishes</td>
<td>0706.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Raisins, Sultanas</td>
<td>0806.20.0000</td>
<td>2</td>
</tr>
<tr>
<td>Rhubarb</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Rose Hips</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Rutabaga</td>
<td>1214.90.0040</td>
<td>3</td>
</tr>
<tr>
<td>Salep</td>
<td>0714.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Salsify</td>
<td>0706.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Savory</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Scorzonera</td>
<td>0706.90.0000</td>
<td>8</td>
</tr>
<tr>
<td>Spinach</td>
<td>0709.70.0000</td>
<td>9</td>
</tr>
<tr>
<td>Squash</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Sorrel</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Soursops</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Soybean Sprouts</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: *Transportation Facts*
<table>
<thead>
<tr>
<th>Commodity</th>
<th>Schedule B Number</th>
<th>Check Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweetsops</td>
<td>0810.90.5000</td>
<td>0</td>
</tr>
<tr>
<td>Sweet Marjoram</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Tarragon</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>0702.00.0000</td>
<td>1</td>
</tr>
<tr>
<td>Turnips</td>
<td>0706.10.4000</td>
<td>7</td>
</tr>
<tr>
<td>Truffles</td>
<td>0709.52.0000</td>
<td>1</td>
</tr>
<tr>
<td>Zucchini</td>
<td>0709.90.5000</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: *Transportation Facts*
Methods of Payment

When deciding which method of payment to use, the seller must weigh the risks involved. The buyer doesn’t want to tie up capital on product that it doesn’t possess, which means that the seller can lose the sale if its competitors are willing to offer more advantageous terms. On the other hand, the seller needs assurances that the buyer won’t default on payment once it has received the goods. 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) like in the buyer’s country?
• What is company policy on extending credit?
• Can the seller offer credit and still make a profit?
• Can the seller afford to extend credit?
• 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 most secure to the least secure, the more common methods of payment are:

• Cash in advance
• Letter of credit
• Drafts
• Open account
• 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 can take the form of a wire transfer or payment by check and is typically considered the safest method of collecting payment for the seller. International wire transfers differ from domestic wire transfers. Sellers should provide clear instructions when international wire transfers are used. Collecting payment on an international check carries all the risks associated with accepting a domestic check, only with longer waiting periods for clearance. 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.
Letters of Credit

The letter of credit (L/C) is the most commonly used method of payment in international sales. It is, however, not without risk. If any discrepancies exist in the documents required by the L/C, or if the deadlines specified in the L/C are not met, the seller will not be paid. An L/C adds to the cost of the product and can tie up the buyer's working capital prior to final delivery.

An 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.

Depending upon the type of L/C used, there are three or four parties formally involved. First, the applicant (buyer) applies to its bank for the issuance of an L/C. The applicant pays for the products and the issuance of the L/C based on the credit terms established with its bank. The applicant's bank, or issuing bank, issues the L/C, verifies that all documents comply with the terms and conditions of the L/C, and pays the seller.

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

The beneficiary's bank can act as an advising bank 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. A confirming bank handles many of the same responsibilities as the advising bank and, in addition, assumes liability for paying the beneficiary should the issuing bank default.

There are two types of L/Cs: revocable and irrevocable. A revocable L/C can be amended or cancelled at any time by any party before the documents are presented for payment. The revocable L/C carries the same risks to the seller as an open account payment. An irrevocable L/C cannot be changed without the exporter's consent. The safest form of payment for the seller is a confirmed irrevocable 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 carefully reviews 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 goods have been loaded on the outbound vessel, 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.

**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 a negotiable instrument, easily transferable from one party to another. Drafts carry the risk that the buyer will not or cannot pay for the goods upon receipt of the draft. It is the burden of the seller to locate a new buyer or pay for a return shipment. There are three types of drafts: sight drafts, time drafts, and date 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.
Date Draft—This type of draft states that payment shall be made by a specific date. This reduces the risk that the buyer will delay payment. However, it does not reduce the risk that the buyer may default on payment at the maturity date.

Open Account

Under an open account, 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 only buy 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 accounts is difficult and costly due to the lack of documents and banking channels.

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. Experienced international bankers can offer advice on foreign exchange risks and offer suggestions on how to hedge against those risks.
<table>
<thead>
<tr>
<th>Method of Payment</th>
<th>Time of Payment to Seller</th>
<th>Goods Available to Buyer</th>
<th>Risk to Seller</th>
<th>Risk to Buyer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash in Advance</td>
<td>Prior to Shipment</td>
<td>On Arrival</td>
<td>None</td>
<td>Buyer has loss of funds until merchandise arrives. Relies completely on seller to ship goods as ordered</td>
</tr>
<tr>
<td>Sight Letter of Credit</td>
<td>Within a few days after shipment</td>
<td>Upon settlement of Letter of Credit (L/C)</td>
<td>Very little, but depends on L/C conditions</td>
<td>L/C requires proof of shipment but relies on seller to ship goods as described in L/C documents</td>
</tr>
<tr>
<td>Time Letter of Credit</td>
<td>At maturity of draft or at discounting of draft</td>
<td>Upon acceptance of time draft</td>
<td>Very little, but depends on L/C conditions</td>
<td>Payment is due after receiving goods, but must be made regardless of product quality</td>
</tr>
<tr>
<td>Sight Draft for Collection or Documents Against Payment</td>
<td>Upon presentation of collection draft</td>
<td>After payment... if all Ocean Bills of Lading are in collection</td>
<td>Possible non-payment of draft</td>
<td>Has assurance of shipment, but relies on seller to ship goods as described in documents accompanying draft</td>
</tr>
<tr>
<td>Time Draft for Collection or Documents Against Acceptance</td>
<td>At maturity of draft</td>
<td>Upon acceptance of draft</td>
<td>Possible non-payment of draft, and buyer has possession of goods</td>
<td>Actual payment is due after receiving goods, payment should be made regardless of quality</td>
</tr>
<tr>
<td>Open Account</td>
<td>Upon payment of invoice</td>
<td>Upon delivery</td>
<td>Relies on buyer to pay invoice when due</td>
<td>No risks</td>
</tr>
</tbody>
</table>

Source: First Tennessee Bank
Insurance

Cargo Insurance

The insurance needs of the shipper are determined by the terms of sale. Common terms of sale are:

- **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.

- **C and F (Cost and Freight)**--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.

- **FAS (Free Alongside a Ship at designated U.S. port of export)**--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)**--Under this term, the seller quotes a price for goods that includes the cost of loading onto transport vessels at a designated point. There are three FOB quotations:
  
  1. **FOB (designated inland point of origin)**--The price quoted applies only at a designated inland shipping point. The seller is responsible for loading goods into the transport vessel, the buyer for all subsequent expenses. Example: FOB Frederick.
  2. **FOB (designated port of exportation)**--The quoted price includes the cost of transporting the goods to the designated point. Example: FOB Baltimore.
  3. **FOB Vessel (designated port of exportation)**--The seller quotes a price covering all expenses up to and including delivery of goods upon an overseas vessel provided by or for the buyer. Example: F.O.B. Vessel Baltimore.

- **EX (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. Example: EX Factory, EX Warehouse, etc.

The terms of sale dictate the point at which the title of goods will 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.

1 Source: *Maryland Exporters' Guide*
The traditional outlets for obtaining cargo insurance are:

- Direct from the airline under its tariff.
- Through a freight forwarder.
- From an insurance company specializing in ocean and air cargo insurance.

When shipping perishables, it may be necessary to obtain coverage directly from an insurance company. Air carriers and freight forwarders do not always provide adequate coverage for perishables.

**Direct from the Airline**—The shipper has two options when obtaining insurance from an air carrier:

- The shipper has the option of declaring the value of the shipment and paying freight charges based upon this declared value. When value is declared to the air carrier, freight costs will be higher as the airline will be responsible for a greater value in the event that the cargo is lost or damaged.
- The shipper may pay freight charges based on the weight of the cargo shipped. When shippers do not declare a value on their goods, the airlines are liable for $9.07 per pound or $20 per kilo on foreign shipments and $0.50 per pound on domestic shipments. Shipments based on the weight of the cargo shipped are commonly referred to as "No Value Declared" shipments.

The air waybill of lading states the terms of liability that the airline assumes. It is critical that the shipper understand that the airline is not responsible for such perils as "Acts of God." Further, the duration of coverage for which the airlines are responsible may not be as broad as that provided under an open cargo policy.

**Freight Forwarder**—The second avenue for obtaining cargo insurance is through a 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 third 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 shippers must insure the goods. The policy is customarily issued on a warehouse-to-warehouse basis which 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.

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 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 anyone sustains loss or damage for the general benefit of the vessel, then all parties 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.

**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 the following steps without delay:

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, and damaged merchandise should be kept as evidence of the loss.

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 assured 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 assured must contact the nearest claim agent so that 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 that he or she can be represented. When filing a claim the assurer may request some or all of the following documents:

• Contract of carriage
• Bill of lading or air waybill
• Certificate of insurance or declaration of insurance
• Copies of letters of claims filed with 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
• Correspondence or verbal advice from carriers
• Packing list
• Valued inventory
• 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


**Transport Guidelines**

In addition to obtaining competitive freight rates and services, a shipper should ensure that the product will arrive in top-quality condition. The key steps the shipper should follow are as follows:

- Transport only top quality products.
- Ensure quality control with grading.
- Maintain quality with effective packaging.
- Precool produce to ensure quality.
- Choose the best mode of transportation.
- Check the transport equipment before loading.
- Use proper loading practices.
- Use recommended transit and storage practices.

**Transport Only Top-Quality Products**

Under the best circumstances, product quality can only be maintained, not improved, during transportation. Most agricultural products are perishable. Therefore, 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.
- Help expand markets.

Bruised, decaying, or overripe 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 that cause further ripening and decay.
- Lose more water resulting in shriveling and wilting.
- Discourage repeat sales.
- Reduce profits.

During transportation, storage, and marketing, products may be exposed to:

- Rough handling during loading and unloading.
- Compression from the overhead weight of other product containers.
- Impact and vibration during land, sea, and air transportation.
- Rolling, pitching, yawing, heaving, swaying, and surging during sea transportation.
- Loss of moisture to the surrounding air.
- Higher or lower than recommended temperatures.
• Ethylene gas from vehicle exhaust or product ripening.
• Odors from other products or residues.

By selecting and packing only top-quality products, shippers can help ensure good arrival condition of agricultural products transported over long distances. Grading, good packaging, precooling, and proper transportation equipment are essential to maintaining product quality from the field to the consumer.

Importers and consumers of U.S. agricultural products demand high-quality fresh products in return for the high prices they pay. Growers and shippers should use the buyer's specifications for grading to monitor product quality, condition, size, and maturity. While not all products have official grade standards, common sense techniques can be used to ensure the packing and transportation of only high-quality items.

Uniformly high-quality in appearance and taste is essential to increasing importer and consumer willingness to try the products and buy them again. Packing, precooling, refrigerating, transporting, storing, and selling poor-quality products wastes time, money, and materials.

Grading Practices

Clean and treat fresh products only as necessary:

• Wash off dirt and debris resulting from harvest operations.
• Discard bruised, cut, decayed, insect-infested, odd-sized, immature, or overripe items.
• Use only the minimum amount necessary of fungicides/bactericides to limit decay on certain products, strictly in accordance with label instructions.
• Use only the minimum amount necessary of officially approved wax or resin coatings to reduce moisture loss on certain products, strictly in accordance with label instructions.
• Use only the minimum amount necessary of officially approved pesticides for certain products to eliminate insect pests, strictly in accordance with label instructions and health and safety regulations.
• Remove field heat (precool) as soon as possible after harvest.
• Use ethylene gas for certain products to ripen and improve color.

Sort and package fresh produce by size and level of maturity:

• Use voluntary grade standards or buyer's specifications.
• Place only uniform sizes or amounts in each shipping container.
• Place only products with a uniform level of maturity in each container.
• Clearly mark the grade, size, weight, or count on the container.
Equipment manufacturers can provide advice on harvesting, washing, sorting, sizing, weighing, waxing, drying, precooling, and packaging equipment suitable for a particular operation. The U.S. Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), and chemical companies can provide current information on U.S. regulations for fungicides, bactericides, waxes, resins, and pesticides.

Grade Standards

The USDA Agricultural Marketing Service (AMS) maintains 156 standards covering 85 fresh fruits, vegetables, and other special products, as well as inspection instructions. Grade standards and inspection instructions are also maintained for many other agricultural commodities.

The standards and instructions for fresh produce give guidance on size, color, shape, texture, maturity, cleanliness, and defects. The standards are voluntary except in the case of the following products.

Under USDA domestic marketing orders, the following items are subject to mandatory grade, size, quality, or maturity regulations:

- avocados
- kiwifruits
- Irish potatoes
- dates
- limes
- prunes
- filberts
- canned ripe olives
- raisins
- grapefruits
- onions
- tomatoes
- table grapes
- oranges
- walnuts

Shippers must keep abreast of the changing dates and scope of marketing orders. Under the Export Apple and Pear Act and the Export Grape and Plum Act, inspections of these fruits are required to assure that they meet minimum quality standards.

Some State governments and industry trade associations have grade standards or regulations for particular products. Examples are Hawaiian grades for ginger root, papayas, and pineapples; Puerto Rican grades for coconuts; and industry grades for bananas.

Official Inspections

Many foreign countries may have their own grade standards, phytosanitary regulations, pesticide laws, and environmental restrictions such as recycling mandates. The USDA Foreign Agricultural Service (FAS) Office of Food Safety and Technical Services serves as the primary contact for inquiries related to foreign product labeling and food standards, packaging, sanitary or phytosanitary regulations, pesticide residues, commodity quality and quantity complaints, and other technical
requirements for U.S. products imported to foreign countries. Inspections for grade, condition, size, or maturity of commodities may be requested by shippers, receivers, importers, or any other financially interested party. The inspections can be done at the shipping point, receiving market, and in the case of exports, at the ports of embarkation or entry. Inspections or documentation also may be necessary for packaging materials such as wood crates and pallets.

Regardless of whether the inspection is voluntary or mandatory, licensed Federal or Federal/State agricultural employees will perform the inspections in the United States and issue an official inspection certificate. A fee is charged for these inspections.

All raw or processed fruits and vegetables are subject to inspection by the FDA for illegal pesticide residues or other contamination according to tolerances established by the EPA. These tolerances are called "defect action levels." Products with prohibited or excessive pesticide residues or contamination must be reconditioned or destroyed. Foreign countries have similar regulations.

When requested by the foreign buyer, exports of U.S.-grown unprocessed plants or plant products are inspected for insects or disease and provided with a phytosanitary certificate by the Animal and Plant Health Inspection Service (APHIS) or State departments of agriculture. AMS provides certifications of grade and quality for fresh products and a verification program for frozen or otherwise processed agricultural products.

Quality control with grading helps growers and shippers meet the needs of different markets, pass inspections, become reliable suppliers, and receive higher prices for their products. Quality control reduces the risk of financial loss from downgraded or rejected shipments.

Proper packaging of agricultural products is essential to maintaining product quality during transportation and marketing. Packaging in the form of shipping containers serves to enclose the product and facilitates handling. It makes no sense to ship high-quality, high-value, perishable products in poor-quality packaging, which will lead to damage, decay, low prices, or outright rejection by the buyer.

Packaging must withstand:

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

Packaging materials are chosen on the basis of product needs and requirements. Factors to be considered are product packing and precooling method; packaging strength, cost, and availability; buyer specifications; and freight rates. Importers, buyers, and packaging manufacturers can provide valuable recommendations.

All packaging must be recyclable or reusable, and use the minimum amount of material necessary to protect the product. The options of incinerating packaging waste or shipping waste to landfills are being reduced throughout the U.S. and Europe. Mandatory recycling programs, packaging bans, and solid waste reduction programs are being established.

Packaging also must be standardized to facilitate unit loading on standard-size reusable pallets. Pallet leasing companies are being established in response to economic as well as environmental concerns.

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, lugs, pallets.
- **Paper**—Bags, sleeves, wraps, liners, pads, excelsior, and labels.
- **Plastic**—Pallets, bins, boxes, trays, bags (mesh, solid), containers, sleeves, film wraps, liners, dividers, and slipsheets.
- **Polystyrene**—Foam boxes, trays, lugs, sleeves, liners, dividers, and pads.

Bins, boxes, crates, trays, lugs, baskets, and bags are considered shipping containers. Baskets, however, are difficult to handle in mixed loads of rectangular boxes. Bags provide only limited product protection for perishable commodities.

*The fiberboard box*—This box is the most widely used container, due in part to its recyclability. There are many fiberboard box styles. A minimum 1,896 kPa (275 lb/in²) bursting-test-strength 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.

Fiberboard boxes for products that are precooled in the box, packed wet, or packed with ice must be wax-impregnated or coated with water-resistant material. These treatments are currently under review by
packaging manufacturers because wax-treated fiberboard is not considered recyclable and there are questions about some of the polyethylene coatings. Other formulations or liners are being developed to solve this problem.

The compression strength of untreated fiberboard can be reduced by more than one-half in conditions of 90-percent relative humidity. In addition to maintaining box strength, wax helps to reduce the loss of moisture from the product to the fiberboard. All glued boxes should be made with a water-resistant adhesive that also is recyclable.

Holes are provided in most fiberboard boxes to provide ventilation of product heat (respiration) and allow circulation of cold air to the product. 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 are still popular with some shippers due to their material strength and resistance to high humidity 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 much concern over whether wood crates are recyclable or reusable. Machines are available to grind up wood crates for conversion into other materials. Fasteners in wood crates should be magnetic and have a maximum diameter of 10 mm.

A 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 cross-stacked boxes can lose up to 50 percent of their top to bottom compression strength.

Various materials are added to shipping containers to provide additional strength and product protection. Again, these additional materials should be kept to a minimum to reduce packaging waste.

Fiberboard trays, dividers, or partitions, and double-or triple-layer sides and ends in fiberboard 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 is the case with asparagus; provide chemical treatment to reduce decay, as is the case with sulfur dioxide pads for grapes; and absorb ethylene, such as the case with potassium permanganate pads used in boxes of bananas and flowers.
**Plastic Film Liners or Bags**—Plastic film liners or bags are used to retain moisture. Perforated plastic is used for most products to allow exchange of gases and avoid excessive humidity. Solid plastic is used to seal the products and provide for a modified atmosphere by reducing the amount of oxygen available for respiration and ripening. This is done for bananas, strawberries, and tomatoes.

**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. Wet paper is used to provide moisture to fresh cut herbs and flowers.

Shippers should check with FAS or APHIS for packaging materials restrictions, especially those made from plant parts such as wood, straw, or leaves, in the destination country. 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**

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 containers for the retailer or consumer packages.

**Types of Packs**

Types of packs include:

- **Volume fill**—Products are placed by hand or machine into the container 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 container. 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.
• Film or shrink wrap--Each fruit or vegetable is individually wrapped and sealed in film to reduce moisture loss and decay. The film may be treated with fungicides or other chemicals.
• Modified atmosphere--Individual consumer packs, shipping containers, or pallet loads of containers are sealed with plastic film or bags. The oxygen level is reduced and the carbon dioxide level is increased. This reduces product respiration and slows the ripening process.

Shipping containers must be sized and filled correctly. Containers that are very wide and weigh more than 15 kg (33 lb) encourage rougher handling, product damage, and container failure. Under labor agreements or other regimes, importers may charge a premium for handling containers weighing more than 15 kg.

Overfilling causes product bruising and excessive bulging of the container which leads to reduced compression strength and container failure. Underfilling also causes product damage. The product is bruised as it moves around inside the shipping container during transport and handling.

Standardization

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

• Reduce container inventory for manufacturers and growers.
• Provide unit loads and more stable mixed pallet loads.
• Reduce transportation and marketing costs.
• 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 1219 mm x 1016 mm (48 in x 40 in).
  • International Standards Organization pallet used in Europe (ISO) 1200 mm x 1000 mm (47.24 in x 39.37 in).
  • Europallet, also widely used in Europe ISO 1200 mm x 800 mm (47.24 in x 31.5 in).

The following five container sizes that fit well on all three of the above pallets are recommended:

• 600 mm x 400 mm
• 400 mm x 300 mm
• 400 mm x 200 mm
• 300 mm x 200 mm
• 200 mm x 150 mm
Unit Loads

A large number of shippers and receivers have switched from handling individual shipping containers to unit loads on pallets. Most distribution centers are set up to store palletized loads in three-tier racks.

Unit loads provide for:

- Reduced handling of individual shipping containers.
- Less damage to the containers and the products inside.
- Faster loading and unloading of transportation equipment.
- More efficient distribution center operations.
- 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.
- 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 pallets are standard in European pallet pools and should be used for any exports to Europe. One-way pallets are increasingly being rejected by importers and receivers due to recycling and 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, and cause the entire load to lean or fall off the pallet. A sheet of fiberboard with holes for air circulation can be used to 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 to 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 shipping containers 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 containers must be strong enough to be cross-stacked without collapsing. Film wrap should not be used on shipping containers of products that need ventilation.

**Slipsheets**

Slipsheets are used by some shippers because they cost less than pallets. They also eliminate the cost of transporting and returning pallets. A special forklift is needed to transfer slipsheet loads to and from the pallets at the shipper's and receiver's distribution center. Shipping containers on slipsheets are cross-stacked, stretch-wrapped, or otherwise secured with cornerboards and strapping.

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.

**Labeling and Branding**

Labeling of shipping containers helps to identify and advertise the products and assists receivers in storing and retrieving them. Fiberboard boxes can be preprinted with colorful labels. Other container materials require 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, and recipe brochures for the consumer.

All containers should be clearly labeled and branded in the language of the destination country. The following information should be included:

- 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.
- 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. In addition to the product name, net weight, and name and address of the manufacturer, packer, or distributor, processed items must have all ingredients listed. The FDA classifies fruits and vegetables with wax or resin coatings as processed products which must be properly labeled with names of the coating displayed at the point of retail sale or on the individual items.

As mentioned earlier, the FAS Office of Food Safety and Technical Services serves as the primary contact for U.S. company inquiries related to foreign product labeling and food standards.

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
- The rate of respiration (heat generated by the product)
- The rate of ripening
- The loss of moisture (shriveling and wilting)
- The production of ethylene (ripening gas generated by the product)
- The 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
• 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 precooled. Wood wirebound or nailed crates and waxed or coated fiberboard boxes are used for packed products that are precooled with water or ice after packing. This process is being modified in response to the demand for recyclable containers.

Precooling of products packed in shipping containers 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
- asparagus
- beans, lima
- beans, snap
- bean sprouts
- blackberries
- broccoli
- brussels sprouts
- carrots, bunched
- corn, sweet
- endive
- kale
- lettuce
- mushrooms
- onions, green
- okra
- parsley
- peas
- raspberries
- spinach
- strawberries
- watercress

**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--Containers 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
  of containers 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
  shipping containers.
• Vacuum cooling--Heat is removed from products packed in shipping
  containers by drawing a vacuum in a chamber.
• Hydrovacuum cooling--Moisture is added to products packed in
  shipping containers before or during the vacuum process to speed the
  removal of heat.
• Package-icing--Slush or crushed ice is injected into each shipping
  container of product. Some operations use bulk containers.

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 or dollies, 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 one-half 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 precooled as near as possible to the recommended storage
temperature and relative humidity. Product temperatures should be taken
in sample shipping containers by inserting an electronic thermometer into
the product. The data should be recorded for future reference.

Tables 1-6 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 7 and 8 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 warm up after precooling. Condensation on cool product surfaces at higher air temperatures also spreads decay.

The method of transportation, condition of the transport equipment, loading method, and transit and storage practices affect the success of precooling. If the recommended temperature and relative humidity are not maintained after precooling, product quality will deteriorate.

After precooling, the products must be properly loaded and transported at or near the recommended storage temperature and relative humidity to maintain quality. 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
- Quality of transportation service

Reliability and quality of transportation service 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 most high volume products 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 can offer door-to-door service. This 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 value and highly perishable. Freight costs are higher by air. Transit times, however, are in hours instead of days.

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.
- Maritime containers--For rail, highway, and lift-on/lift-off ocean transport.
- Breakbulk ocean vessels--Handling palletized or individual shipping containers in refrigerated holds of the ship.
- Railroad boxcars--Handling palletized or individual shipping containers.

**Refrigeration Systems**

The following refrigeration 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 vented into the cargo compartment. 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 the cargo area or within individual shipping containers. Shippers must check with airlines prior to using dry ice. 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.

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—Fresh air exchange in the refrigeration system or separate vents protects products from a buildup of carbon dioxide or ethylene.

Multitemperature—A mechanical or cryogenic system provides two or three temperature conditions in separate compartments of a trailer.

Modified or controlled atmosphere—A specific percentage of nitrogen or carbon dioxide gas is added to pallet bags, or to the cargo compartment of refrigerated trailers or van containers, to reduce product decay, respiration, and ripening of certain products. Controlled atmosphere systems monitor and replenish the cargo with gas as needed.

**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 even product temperatures and higher relative humidities.
- 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 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, particularly in loads of:
  - apples
  - apricots
  - avocados
  - bananas
  - Belgian endive
  - broccoli

  - brussels sprouts
  - cabbage
  - cauliflower
  - cherimoyas
  - cucumbers
  - cut flowers

  - plants
  - kiwifruits
  - greens
  - lettuce
  - plantains
  - cut flowers

• Provisions for application of modified atmospheres with reduced oxygen and elevated carbon dioxide levels, particularly in loads of:
  - apples
  - asparagus
  - avocados

  - bananas
  - cherries
  - kiwifruits

  - mangoes
  - pears
  - strawberries

• 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 from carrier to carrier 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.
Check the Transport Equipment Before Loading

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 be recently calibrated and supply 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
- 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
- Provisions for load locking and bracing

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

- With the doors closed, have someone inside the cargo area check 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.
- Determine the location of the sensing element that controls the discharge air temperature. 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.
Use Proper Loading Practices

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 shipping containers, with or without pallets
- Unit loading of palletized or slipsheet loads of containers with pallet jacks or forklifts

Air Circulation

Inadequate provisions for air circulation will ruin a load, even in well-designed transportation equipment. When possible, shipping containers 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.
- Chilling injury or freezing injury during operation of the refrigeration unit.

Temperature Control

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.
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.

**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
- Wood load gates constructed of 25 mm x 102 mm (1 in x 4 in) material

Recycling, reuse, and reduction of packaging waste should be kept in mind when specifying and using bracing materials.

**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.

Fumigations for pest control inside loaded transportation equipment are usually done under supervision by APHIS 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.

**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 shipping containers 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 shipping containers. 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.

**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.
- Unit loads must be thoroughly precooled 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.

**Top Air Delivery**

For refrigerated trailers and van 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 arranged evenly spaced, with lengthwise air flow channels on every other layer, to ventilate product heat (respiration).
- Header stacks must be provided at the front bulkhead of the trailer or van 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 support the offset shipping containers stacked above.
- 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.
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 shipping containers should have bottom-to-top ventilation slots that align in the stacks. Otherwise, small vertical air flow channels are needed between containers as a result of the slight bulge in the container 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 shipping containers. Only the floor area next to the doorway should be open to permit return air flow.

Top-Icing

Top-ice is used for certain fresh products to supplement mechanical refrigeration and help maintain a high humidity. Refrigeration units on trailers and containers cannot control relative humidity.

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 9 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.

Temperature Recorders

In addition to trip insurance, all loads should have a small air-temperature recorder 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 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, if necessary. These steps are essential for settling claims over temperature management during transportation.

**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
- Production and absorption of odors

Groups of fresh products suitable for transportation and storage together have been identified and are listed in table 13 at the end of this section. Products sensitive to chilling, freezing, moisture loss, ethylene, and odors are listed in tables 7-12.

Many products are subject to chilling injury when transported or stored at lower than recommended temperatures. 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 are damaged by chilling injury before they freeze.

Most products need to be transported and stored at a high relative humidity. Some products are more susceptible to moisture loss than others. 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. 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. Never load fruit, vegetables, or other food products with nonfood cargos 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.

**Multi-Temperature Loads**

Trailers and containers with two or three separate compartments can be used to carry loads of products with different temperature requirements. Advance planning is required when loading multi-temperature 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 and Controlled Atmosphere Loads**

Modified or controlled atmospheres of reduced oxygen, and elevated carbon dioxide and nitrogen, are provided to trailers and containers after loading is completed. The trailers and containers must be equipped with channels at the doorway for a plastic film curtain and gas ports for the application of the treatment.
The refrigeration unit, walls, ceiling, floor, and doors must be adequately sealed from outside air. Otherwise, the modified atmosphere will dissipate quickly. Warning labels also must be applied to the equipment to caution that the atmosphere is not life supporting and that the cargo area must be ventilated properly before personnel can enter to unload the cargo.

**Ventilation**

Atmospheres also are modified by adjusting vents on the trailers and containers to reduce either carbon dioxide or ethylene buildup. 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.

**Use Recommended Transit and Storage Procedures**

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. Some products, however, can be consolidated in storage before or after transportation to obtain lower freight rates or higher prices.

**Transit 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. Gauges are provided for this purpose on most equipment. It is now possible to monitor refrigeration unit operating conditions from a central control room on a ship or by satellite transmission. Most trailers and containers also are provided with an exterior electronic or mechanical temperature recorder.

**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 adequately braced and the correct temperature was 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 produced by equipment exhaust and other products, 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**

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 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 as they do not produce 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 can be used to absorb ethylene.
Transport Guideline Tables

Table 1: Recommended Temperature and Relative Humidity, and Approximate Transit and Storage Life for Fruits and Vegetables ........................................... 95

Table 2: Suggested Shipping Temperatures for Acclimatized Foliage Plants ........................................... 102

Table 3: Recommended Temperature, Relative Humidity and Storage Period for Potted Plants Not Acclimated to Darkness ........................................... 104

Table 4: Recommended Temperature, Relative Humidity and Approximate Transit and Storage Period for Cut Flowers and Florist Greens ........................................... 106

Table 5: Recommended Temperature and Relative Humidity, and Approximate Transit and Storage Life for Seafood, Meat, Dairy, and Egg Products ........................................... 110

Table 6: Recommended Temperature and Relative Humidity, and Approximate Transit and Storage Life for Miscellaneous Products ........................................... 113

Table 7: Products Sensitive to Chilling Injury ........................................... 114

Table 8: Products Susceptible to Freezing Injury ........................................... 115

Table 9: Top-icing of Products ........................................... 116

Table 10: Moisture Loss Rate of Products ........................................... 117

Table 11: Products that are Ethylene Producers or Ethylene Sensitive ........................................... 118

Table 12: Products which Produce or Absorb Odors ........................................... 119

Table 13: Compatibility Groups ........................................... 120

Table 14: Container Specifications ........................................... 125

Table 15: Containers Provided By Airlines ........................................... 126
<table>
<thead>
<tr>
<th>Transport Guideline Figures</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1: Top view of pattern for straight in-loading of palletized unit loads</td>
<td>127</td>
</tr>
<tr>
<td>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</td>
<td>127</td>
</tr>
<tr>
<td>Figure 3: Top view of pattern for alternate loading of pallets used to increase the number of pallet leaks when the weight of the product permits</td>
<td>127</td>
</tr>
<tr>
<td>Figure 4: Side, end, and detail views of the recommended air-flow hand loading pattern for trailers or containers with top air-delivery</td>
<td>128</td>
</tr>
<tr>
<td>Figure 5: Side and end view of the recommended vertical air-flow hand loading pattern for bottom-air delivery trailers and containers</td>
<td>128</td>
</tr>
</tbody>
</table>
### Table 1: Recommended Temperature and Relative Humidity, and Approximate Transit and Storage Life for Fruits and Vegetables.

<table>
<thead>
<tr>
<th>Product</th>
<th>Temperature °C</th>
<th>Temperature °F</th>
<th>Relative Humidity (percent)</th>
<th>Approximate Storage Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amaranth</td>
<td>0 to 2</td>
<td>32 to 36</td>
<td>95 to 100</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Anise</td>
<td>0 to 2</td>
<td>32 to 36</td>
<td>90 to 95</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Apples</td>
<td>-1 to -4</td>
<td>30 to 40</td>
<td>90 to 95</td>
<td>1 to 12 months</td>
</tr>
<tr>
<td>Apricots</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Artichokes, globe</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Asian pear</td>
<td>1</td>
<td>34</td>
<td>90 to 95</td>
<td>5 to 6 months</td>
</tr>
<tr>
<td>Asparagus</td>
<td>0 to 2</td>
<td>32 to 35</td>
<td>95 to 100</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Atemoya</td>
<td>13</td>
<td>55</td>
<td>85 to 90</td>
<td>4 to 6 weeks</td>
</tr>
<tr>
<td>Avocados, Fuerte, Hass</td>
<td>7</td>
<td>45</td>
<td>85 to 90</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Avocados, Lula, Booth-1</td>
<td>4</td>
<td>40</td>
<td>90 to 95</td>
<td>4 to 8 weeks</td>
</tr>
<tr>
<td>Avocados, Fuchs, Pollock</td>
<td>13</td>
<td>55</td>
<td>85 to 90</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Babaco</td>
<td>7</td>
<td>45</td>
<td>85 to 90</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Bananas, green</td>
<td>13 to 14</td>
<td>56 to 58</td>
<td>90 to 95</td>
<td>1 to 4 weeks</td>
</tr>
<tr>
<td>Barbados cherry</td>
<td>0</td>
<td>32</td>
<td>85 to 90</td>
<td>7 to 8 weeks</td>
</tr>
<tr>
<td>Bean sprouts</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>7 to 9 days</td>
</tr>
<tr>
<td>Beans, dry</td>
<td>4 to 10</td>
<td>40 to 50</td>
<td>40 to 50</td>
<td>6 to 10 months</td>
</tr>
<tr>
<td>Beans, green or snap</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>95</td>
<td>7 to 10 days</td>
</tr>
<tr>
<td>Beans, lima, in pods</td>
<td>5 to 6</td>
<td>41 to 43</td>
<td>95</td>
<td>5 days</td>
</tr>
<tr>
<td>Beets, bunched</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Beets, topped</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>4 to 6 months</td>
</tr>
<tr>
<td>Belgian endive</td>
<td>2 to 3</td>
<td>36 to 38</td>
<td>95 to 98</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Bitter melon</td>
<td>12 to 13</td>
<td>53 to 55</td>
<td>86 to 90</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Black sapote</td>
<td>13 to 15</td>
<td>55 to 60</td>
<td>85 to 90</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Blackberries</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>2 to 3 days</td>
</tr>
<tr>
<td>Blood orange</td>
<td>4 to 7</td>
<td>40 to 44</td>
<td>90 to 95</td>
<td>3 to 8 weeks</td>
</tr>
<tr>
<td>Blueberries</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Bok choy</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>3 weeks</td>
</tr>
</tbody>
</table>
Table 1: Continued

<table>
<thead>
<tr>
<th>Product</th>
<th>Temperature °C</th>
<th>Temperature °F</th>
<th>Relative Humidity (percent)</th>
<th>Approximate Storage Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boniato</td>
<td>13 to 15</td>
<td>55 to 60</td>
<td>85 to 90</td>
<td>4 to 5 months</td>
</tr>
<tr>
<td>Breadfruit</td>
<td>13 to 15</td>
<td>55 to 60</td>
<td>85 to 90</td>
<td>2 to 6 weeks</td>
</tr>
<tr>
<td>Broccoli</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Brussels sprouts</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>3 to 5 weeks</td>
</tr>
<tr>
<td>Cabbage, early</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>3 to 6 weeks</td>
</tr>
<tr>
<td>Cabbage, late</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>5 to 6 months</td>
</tr>
<tr>
<td>Cactuses leaves</td>
<td>2 to 4</td>
<td>36 to 40</td>
<td>90 to 95</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Cactus pear</td>
<td>2 to 4</td>
<td>36 to 40</td>
<td>90 to 95</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Caimito</td>
<td>3</td>
<td>38</td>
<td>90</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Calabaza</td>
<td>10 to 13</td>
<td>50 to 55</td>
<td>50 to 70</td>
<td>2 to 3 months</td>
</tr>
<tr>
<td>Calamander</td>
<td>9 to 10</td>
<td>48 to 50</td>
<td>90</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Canister</td>
<td>13 to 15</td>
<td>55 to 60</td>
<td>85 to 90</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Cantaloup (3/4-slip)</td>
<td>2 to 5</td>
<td>36 to 41</td>
<td>95</td>
<td>15 days</td>
</tr>
<tr>
<td>Cantaloup (full-slip)</td>
<td>0 to 2</td>
<td>32 to 36</td>
<td>95</td>
<td>5 to 14 days</td>
</tr>
<tr>
<td>Carambola</td>
<td>9 to 10</td>
<td>48 to 50</td>
<td>85 to 90</td>
<td>3 to 4 weeks</td>
</tr>
<tr>
<td>Carrots, bunched</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Carrots, mature</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>7 to 9 months</td>
</tr>
<tr>
<td>Carrots, immature</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>4 to 6 weeks</td>
</tr>
<tr>
<td>Cashew apple</td>
<td>0 to 2</td>
<td>32 to 36</td>
<td>85 to 90</td>
<td>5 weeks</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>0</td>
<td>32</td>
<td>95 to 98</td>
<td>3 to 4 weeks</td>
</tr>
<tr>
<td>Celeriac</td>
<td>0</td>
<td>32</td>
<td>97 to 99</td>
<td>6 to 8 months</td>
</tr>
<tr>
<td>Celery</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>2 to 3 months</td>
</tr>
<tr>
<td>Chard</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Chayote squash</td>
<td>7</td>
<td>45</td>
<td>85 to 90</td>
<td>4 to 6 weeks</td>
</tr>
<tr>
<td>Cherimoya</td>
<td>13</td>
<td>55</td>
<td>90 to 95</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Cherries, sour</td>
<td>0</td>
<td>32</td>
<td>90 to 95</td>
<td>3 to 7 days</td>
</tr>
<tr>
<td>Cherries, sweet</td>
<td>-1 to -0.5</td>
<td>30 to 31</td>
<td>90 to 95</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Product</td>
<td>Temperature</td>
<td>Relative Humidity (percent)</td>
<td>Approximate Storage Life</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
<td>----------------------------</td>
<td>---------------------------</td>
<td></td>
</tr>
<tr>
<td>Chinese broccoli</td>
<td>0</td>
<td>95 to 100</td>
<td>10 to 14 days</td>
<td></td>
</tr>
<tr>
<td>Chinese cabbage</td>
<td>0</td>
<td>95 to 100</td>
<td>2 to 3 months</td>
<td></td>
</tr>
<tr>
<td>Chinese long bean</td>
<td>4 to 7</td>
<td>90 to 95</td>
<td>7 to 10 days</td>
<td></td>
</tr>
<tr>
<td>Clementine</td>
<td>4</td>
<td>90 to 95</td>
<td>2 to 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Coconuts</td>
<td>0 to 1.5</td>
<td>80 to 85</td>
<td>1 to 2 months</td>
<td></td>
</tr>
<tr>
<td>Collards</td>
<td>0</td>
<td>95 to 100</td>
<td>10 to 14 months</td>
<td></td>
</tr>
<tr>
<td>Corn, sweet</td>
<td>0</td>
<td>95 to 98</td>
<td>5 to 8 days</td>
<td></td>
</tr>
<tr>
<td>Cranberries</td>
<td>2 to 4</td>
<td>90 to 95</td>
<td>2 to 4 months</td>
<td></td>
</tr>
<tr>
<td>Cucumbers</td>
<td>10 to 13</td>
<td>95</td>
<td>10 to 14 days</td>
<td></td>
</tr>
<tr>
<td>Currants</td>
<td>-0.5 to 0</td>
<td>90 to 95</td>
<td>1 to 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Custard apples</td>
<td>5 to 7</td>
<td>85 to 90</td>
<td>4 to 6 weeks</td>
<td></td>
</tr>
<tr>
<td>Diakon</td>
<td>0</td>
<td>95 to 100</td>
<td>4 months</td>
<td></td>
</tr>
<tr>
<td>Dates</td>
<td>-18 to 0</td>
<td>75</td>
<td>6 to 12 months</td>
<td></td>
</tr>
<tr>
<td>Dewberries</td>
<td>-0.5 to 0</td>
<td>90 to 95</td>
<td>2 to 3 days</td>
<td></td>
</tr>
<tr>
<td>Durian</td>
<td>4 to 6</td>
<td>85 to 90</td>
<td>6 to 8 weeks</td>
<td></td>
</tr>
<tr>
<td>Eggplants</td>
<td>12</td>
<td>90 to 95</td>
<td>1 week</td>
<td></td>
</tr>
<tr>
<td>Elderberries</td>
<td>-0.5 to 0</td>
<td>90 to 95</td>
<td>1 to 2 weeks</td>
<td></td>
</tr>
<tr>
<td>Endive and escarole</td>
<td>0</td>
<td>95 to 100</td>
<td>2 to 3 weeks</td>
<td></td>
</tr>
<tr>
<td>Feijoa</td>
<td>5 to 10</td>
<td>90</td>
<td>2 to 3 weeks</td>
<td></td>
</tr>
<tr>
<td>Figs, fresh</td>
<td>-0.5 to 0</td>
<td>85 to 90</td>
<td>7 to 10 days</td>
<td></td>
</tr>
<tr>
<td>Garlic</td>
<td>0</td>
<td>65 to 70</td>
<td>6 to 7 months</td>
<td></td>
</tr>
<tr>
<td>Ginger root</td>
<td>13</td>
<td>65</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td>Gooseberries</td>
<td>-0.5 to 0</td>
<td>90 to 95</td>
<td>3 to 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Granadilla</td>
<td>10</td>
<td>85 to 90</td>
<td>3 to 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Grapefruit, CA &amp; AZ</td>
<td>14 to 15</td>
<td>85 to 90</td>
<td>6 to 8 weeks</td>
<td></td>
</tr>
<tr>
<td>Grapefruit, FL &amp; TX</td>
<td>10 to 15</td>
<td>85 to 90</td>
<td>6 to 8 weeks</td>
<td></td>
</tr>
<tr>
<td>Grapes, Vinifera</td>
<td>-1 to -0.5</td>
<td>90 to 95</td>
<td>1 to 6 months</td>
<td></td>
</tr>
<tr>
<td>Product</td>
<td>Temperature</td>
<td>Relative Humidity</td>
<td>Approximate Storage Life</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td>°F</td>
<td>(percent)</td>
<td></td>
</tr>
<tr>
<td>Grapes, American</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>85</td>
<td>2 to 8 weeks</td>
</tr>
<tr>
<td>Greens, leafy</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Guavas</td>
<td>5 to 10</td>
<td>41 to 50</td>
<td>90</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Haricot vert</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>95</td>
<td>7 to 10 weeks</td>
</tr>
<tr>
<td>Horseradish</td>
<td>-1 to 0</td>
<td>30 to 32</td>
<td>98 to 100</td>
<td>10 to 12 months</td>
</tr>
<tr>
<td>Jaboticaba</td>
<td>13 to 15</td>
<td>55 to 60</td>
<td>90 to 95</td>
<td>2 to 3 days</td>
</tr>
<tr>
<td>Jackfruit</td>
<td>13</td>
<td>55</td>
<td>85 to 90</td>
<td>2 to 6 weeks</td>
</tr>
<tr>
<td>Jaffa orange</td>
<td>8 to 10</td>
<td>46 to 50</td>
<td>85 to 90</td>
<td>8 to 12 weeks</td>
</tr>
<tr>
<td>Japanese eggplant</td>
<td>8 to 12</td>
<td>46 to 54</td>
<td>90 to 95</td>
<td>1 week</td>
</tr>
<tr>
<td>Jerusalem Artichoke</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>4 to 5 months</td>
</tr>
<tr>
<td>Jicama</td>
<td>13 to 18</td>
<td>55 to 65</td>
<td>65 to 70</td>
<td>1 to 2 months</td>
</tr>
<tr>
<td>Kale</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Kiwano</td>
<td>10 to 15</td>
<td>50 to 60</td>
<td>90</td>
<td>6 months</td>
</tr>
<tr>
<td>Kiwifruit</td>
<td>0</td>
<td>32</td>
<td>90 to 95</td>
<td>3 to 5 months</td>
</tr>
<tr>
<td>Kohlrabi</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>2 to 3 months</td>
</tr>
<tr>
<td>Kumquats</td>
<td>4</td>
<td>40</td>
<td>90 to 95</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Langsat</td>
<td>11 to 14</td>
<td>52 to 58</td>
<td>85 to 90</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Leeks</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>2 to 3 months</td>
</tr>
<tr>
<td>Lemons</td>
<td>10 to 13</td>
<td>50 to 55</td>
<td>85 to 90</td>
<td>1 to 6 months</td>
</tr>
<tr>
<td>Lettuce</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Limes</td>
<td>9 to 10</td>
<td>48 to 50</td>
<td>85 to 90</td>
<td>6 to 8 weeks</td>
</tr>
<tr>
<td>Lo bok</td>
<td>0 to 1.5</td>
<td>32 to 35</td>
<td>95 to 100</td>
<td>2 to 4 months</td>
</tr>
<tr>
<td>Loganberries</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>2 to 3 days</td>
</tr>
<tr>
<td>Longan</td>
<td>1.5</td>
<td>35</td>
<td>90 to 95</td>
<td>3 to 5 weeks</td>
</tr>
<tr>
<td>Loquats</td>
<td>0</td>
<td>32</td>
<td>90</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Lychees</td>
<td>1.5</td>
<td>35</td>
<td>90 to 95</td>
<td>3 to 5 weeks</td>
</tr>
<tr>
<td>Malanga</td>
<td>7</td>
<td>45</td>
<td>70 to 80</td>
<td>3 months</td>
</tr>
</tbody>
</table>
Table 1: Continued

<table>
<thead>
<tr>
<th>Product</th>
<th>Temperature °C</th>
<th>Temperature °F</th>
<th>Relative Humidity (percent)</th>
<th>Approximate Storage Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mamey</td>
<td>13 to 15</td>
<td>55 to 60</td>
<td>90 to 95</td>
<td>2 to 6 weeks</td>
</tr>
<tr>
<td>Mangoes</td>
<td>13</td>
<td>55</td>
<td>85 to 90</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Mangosteen</td>
<td>13</td>
<td>55</td>
<td>85 to 90</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Melons:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casaba</td>
<td>10</td>
<td>50</td>
<td>90 to 95</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Crenshaw</td>
<td>7</td>
<td>45</td>
<td>90 to 95</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Honeydew</td>
<td>7</td>
<td>45</td>
<td>90 to 95</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Persian</td>
<td>7</td>
<td>45</td>
<td>90 to 95</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>0</td>
<td>32</td>
<td>95</td>
<td>3 to 4 days</td>
</tr>
<tr>
<td>Nectarines</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Okra</td>
<td>7 to 10</td>
<td>45 to 50</td>
<td>90 to 95</td>
<td>7 to 10 days</td>
</tr>
<tr>
<td>Olives, fresh</td>
<td>5 to 10</td>
<td>41 to 50</td>
<td>85 to 90</td>
<td>4 to 6 weeks</td>
</tr>
<tr>
<td>Onions, green</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>3 to 4 weeks</td>
</tr>
<tr>
<td>Onions, dry</td>
<td>0</td>
<td>32</td>
<td>65 to 70</td>
<td>1 to 8 months</td>
</tr>
<tr>
<td>Onion sets</td>
<td>0</td>
<td>32</td>
<td>65 to 70</td>
<td>6 to 8 months</td>
</tr>
<tr>
<td>Oranges, CA &amp; AZ</td>
<td>3 to 9</td>
<td>38 to 48</td>
<td>85 to 90</td>
<td>3 to 8 weeks</td>
</tr>
<tr>
<td>Oranges, FL &amp; TX</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>85 to 90</td>
<td>8 to 12 weeks</td>
</tr>
<tr>
<td>Papayas</td>
<td>7 to 13</td>
<td>45 to 55</td>
<td>85 to 90</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Passionfruit</td>
<td>7 to 10</td>
<td>45 to 50</td>
<td>85 to 90</td>
<td>3 to 5 weeks</td>
</tr>
<tr>
<td>Parsley</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>2 to 2.5 months</td>
</tr>
<tr>
<td>Parsnips</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>4 to 6 months</td>
</tr>
<tr>
<td>Peaches</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Pears</td>
<td>-1.5 to -0.5</td>
<td>29 to 31</td>
<td>90 to 95</td>
<td>2 to 7 months</td>
</tr>
<tr>
<td>Peas, green</td>
<td>0</td>
<td>32</td>
<td>95 to 98</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Peas, southern</td>
<td>4 to 5</td>
<td>40 to 41</td>
<td>95</td>
<td>6 to 8 days</td>
</tr>
<tr>
<td>Pepino</td>
<td>4</td>
<td>40</td>
<td>85 to 90</td>
<td>1 month</td>
</tr>
<tr>
<td>Peppers, Chili (dry)</td>
<td>0 to 10</td>
<td>32 to 50</td>
<td>60 to 70</td>
<td>6 months</td>
</tr>
<tr>
<td>Product</td>
<td>Temperature °C</td>
<td>Temperature °F</td>
<td>Relative Humidity Percent</td>
<td>Approximate Storage Life</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>---------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Peppers, sweet</td>
<td>7 to 13</td>
<td>45 to 55</td>
<td>90 to 95</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Persimmons, Japanese</td>
<td>-1</td>
<td>30</td>
<td>90</td>
<td>3 to 4 months</td>
</tr>
<tr>
<td>Pineapples</td>
<td>7 to 13</td>
<td>45 to 55</td>
<td>85 to 90</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Plantain</td>
<td>13 to 14</td>
<td>55 to 58</td>
<td>90 to 95</td>
<td>1 to 5 weeks</td>
</tr>
<tr>
<td>Plums and prunes</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>2 to 5 weeks</td>
</tr>
<tr>
<td>Pomegranates</td>
<td>5</td>
<td>41</td>
<td>90 to 95</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Potatoes, early crop</td>
<td>10 to 16</td>
<td>50 to 60</td>
<td>90 to 95</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Potatoes, late crop</td>
<td>4.5 to 13</td>
<td>40 to 55</td>
<td>90 to 95</td>
<td>5 to 10 months</td>
</tr>
<tr>
<td>Pummelo</td>
<td>7 to 9</td>
<td>45 to 48</td>
<td>85 to 90</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Pumpkins</td>
<td>10 to 13</td>
<td>50 to 55</td>
<td>50 to 70</td>
<td>2 to 3 months</td>
</tr>
<tr>
<td>Quinces</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90</td>
<td>2 to 3 months</td>
</tr>
<tr>
<td>Raddichio</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>95 to 100</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Radishes, spring</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>3 to 4 weeks</td>
</tr>
<tr>
<td>Radishes, winter</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>2 to 4 months</td>
</tr>
<tr>
<td>Rambutan</td>
<td>12</td>
<td>54</td>
<td>90 to 95</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Raspberries</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>90 to 95</td>
<td>2 to 3 days</td>
</tr>
<tr>
<td>Rhubarb</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Rutabagas</td>
<td>0</td>
<td>32</td>
<td>98 to 100</td>
<td>4 to 6 months</td>
</tr>
<tr>
<td>Salsify</td>
<td>0</td>
<td>32</td>
<td>95 to 98</td>
<td>2 to 4 months</td>
</tr>
<tr>
<td>Santol</td>
<td>7 to 9</td>
<td>45 to 48</td>
<td>85 to 90</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Sapodilla</td>
<td>16 to 20</td>
<td>60 to 68</td>
<td>85 to 90</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Scorzonera</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>95 to 98</td>
<td>6 months</td>
</tr>
<tr>
<td>Seedless cucumbers</td>
<td>10 to 13</td>
<td>50 to 55</td>
<td>85 to 90</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Snow peas</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>90 to 95</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Soursop</td>
<td>13</td>
<td>55</td>
<td>85 to 90</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Spinach</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Squashes, summer</td>
<td>5 to 10</td>
<td>41 to 50</td>
<td>95</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Product</td>
<td>Temperature</td>
<td>Relative Humidity (percent)</td>
<td>Approximate Storage Life</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------</td>
<td>------------------------------</td>
<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td>Squashes, winter</td>
<td>10</td>
<td>50 to 70</td>
<td>2 to 3 months</td>
<td></td>
</tr>
<tr>
<td>Strawberries</td>
<td>0</td>
<td>90 to 95</td>
<td>5 to 7 days</td>
<td></td>
</tr>
<tr>
<td>Sugar apples</td>
<td>7</td>
<td>85 to 90</td>
<td>4 weeks</td>
<td></td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>13 to 15</td>
<td>85 to 90</td>
<td>4 to 7 months</td>
<td></td>
</tr>
<tr>
<td>Tamarillos</td>
<td>3 to 4</td>
<td>85 to 95</td>
<td>10 weeks</td>
<td></td>
</tr>
<tr>
<td>Tamarinds</td>
<td>7</td>
<td>90 to 95</td>
<td>3 to 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Tangerines, mandarins, and related citrus fruits</td>
<td>4</td>
<td>90 to 95</td>
<td>2 to 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Taro root</td>
<td>7 to 10</td>
<td>85 to 90</td>
<td>4 to 5 months</td>
<td></td>
</tr>
<tr>
<td>Tomatillos</td>
<td>13 to 15</td>
<td>85 to 90</td>
<td>3 weeks</td>
<td></td>
</tr>
<tr>
<td>Tomatoes, mature-green</td>
<td>18 to 22</td>
<td>90 to 95</td>
<td>1 to 3 weeks</td>
<td></td>
</tr>
<tr>
<td>Tomatoes, firm-ripe</td>
<td>13 to 15</td>
<td>90 to 95</td>
<td>4 to 7 days</td>
<td></td>
</tr>
<tr>
<td>Turnips</td>
<td>0</td>
<td>95</td>
<td>4 to 5 months</td>
<td></td>
</tr>
<tr>
<td>Turnip greens</td>
<td>0</td>
<td>95 to 100</td>
<td>10 to 14 days</td>
<td></td>
</tr>
<tr>
<td>Ugli fruit</td>
<td>4</td>
<td>90 to 95</td>
<td>2 to 3 weeks</td>
<td></td>
</tr>
<tr>
<td>Waterchestnuts</td>
<td>0 to 2</td>
<td>98 to 100</td>
<td>1 to 2 months</td>
<td></td>
</tr>
<tr>
<td>Watercress</td>
<td>0</td>
<td>95 to 100</td>
<td>2 to 3 weeks</td>
<td></td>
</tr>
<tr>
<td>Watermelons</td>
<td>10 to 15</td>
<td>90</td>
<td>2 to 3 weeks</td>
<td></td>
</tr>
<tr>
<td>White sapote</td>
<td>19 to 21</td>
<td>85 to 90</td>
<td>2 to 3 weeks</td>
<td></td>
</tr>
<tr>
<td>White asparagus</td>
<td>0 to 2</td>
<td>95 to 100</td>
<td>2 to 3 weeks</td>
<td></td>
</tr>
<tr>
<td>Winged bean</td>
<td>10</td>
<td>90</td>
<td>4 weeks</td>
<td></td>
</tr>
<tr>
<td>Yams</td>
<td>16</td>
<td>70 to 80</td>
<td>6 to 7 months</td>
<td></td>
</tr>
<tr>
<td>Yucca root</td>
<td>0 to 5</td>
<td>85 to 90</td>
<td>1 to 2 months</td>
<td></td>
</tr>
</tbody>
</table>

Source: Hardenburg, Watada, and Wang; McGregor; Sea-Land Service, Inc.; American President Lines.
<table>
<thead>
<tr>
<th>Plant name</th>
<th>1 to 14 days(^1) shipment</th>
<th>15 to 28 days(^1) shipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>Acoelorrhaphe wrightii</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Aglaonema 'Fransher'</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Aglaonema 'Maria'</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Aglaonema 'Silver Queen'</td>
<td>15.5</td>
<td>60</td>
</tr>
<tr>
<td>Aphelandra squarrosa</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Araucaria heterophylla</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Ardisia crispa</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Aspidistra elatior</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Aspientium nidus</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Beaucarnea recurvata</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Brassaia actinophylla</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Cereus peruvianus</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Chamaedorea elegans</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Chamaedorea seifrizii</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Chrysalidocarpus lutescens</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Cordyline terminalis</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>'Baby Doll'</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Cordyline terminalis</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>'Dragon Tongue'</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Crassula argentea</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Dieffenbachia 'Tropic Snow'</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Dizygotheca elegantissima</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Dracaena deremensis</td>
<td>15.5</td>
<td>60</td>
</tr>
<tr>
<td>'Janet Craig'</td>
<td>15.5</td>
<td>60</td>
</tr>
<tr>
<td>Dracaena deremensis</td>
<td>15.5</td>
<td>60</td>
</tr>
<tr>
<td>'Warneckii'</td>
<td>15.5</td>
<td>60</td>
</tr>
<tr>
<td>Dracaena fragrans</td>
<td>15.5</td>
<td>60</td>
</tr>
<tr>
<td>'Massangeana'</td>
<td>15.5</td>
<td>60</td>
</tr>
<tr>
<td>Dracaena godseffiana</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>'Florida Beauty'</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Dracaena marginata</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Dracaena reflexa</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Epipremnum aureum</td>
<td>13</td>
<td>55</td>
</tr>
</tbody>
</table>
Table 2: Continued

<table>
<thead>
<tr>
<th>Plant name</th>
<th>1 to 14 days&lt;sup&gt;1&lt;/sup&gt;</th>
<th>15 to 28 days&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>Ficus benjamina</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Ficus elastica ‘Burgundy’</td>
<td>10 to 15.5</td>
<td>50 to 60</td>
</tr>
<tr>
<td>Ficus elastica ‘Robusta’</td>
<td>10 to 15.5</td>
<td>50 to 60</td>
</tr>
<tr>
<td>Ficus lyrata</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Ficus retusa ‘Nitida’</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Hedera helix ‘Eva’</td>
<td>13 to 15.5</td>
<td>50 to 60</td>
</tr>
<tr>
<td>Hedera helix ‘Sweetheart’</td>
<td>10 to 13</td>
<td>50 to 55</td>
</tr>
<tr>
<td>Howea forsteriana</td>
<td>10 to 18.3</td>
<td>50 to 65</td>
</tr>
<tr>
<td>Hoya carnosa ‘Tricolor’</td>
<td>13 to 18.3</td>
<td>55 to 65</td>
</tr>
<tr>
<td>Maranta leuconeura</td>
<td>10 to 13</td>
<td>50 to 55</td>
</tr>
<tr>
<td>Nephrolepis exaltata ‘Bostoniensis’</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Philodendron scandens oxycardium</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Philodendron selloum</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Phoenix roebelenii</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Piectranthus nummularius</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Pilea ‘Moon Valley’</td>
<td>13 to 18.3</td>
<td>55 to 65</td>
</tr>
<tr>
<td>Pilea ‘Silver Tree’</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Pittosporum tobira</td>
<td>10 to 18.3</td>
<td>50 to 65</td>
</tr>
<tr>
<td>Pittosporum tobira ‘Wheelerii’</td>
<td>10 to 18.3</td>
<td>50 to 65</td>
</tr>
<tr>
<td>Podocarpus gracilior</td>
<td>10 to 18.3</td>
<td>50 to 65</td>
</tr>
<tr>
<td>Rhapis excelsa</td>
<td>10 to 13</td>
<td>50 to 55</td>
</tr>
<tr>
<td>Schefflera arboricola</td>
<td>10 to 13</td>
<td>50 to 55</td>
</tr>
<tr>
<td>Spathiphyllum ‘Mauna Loa’</td>
<td>10 to 13</td>
<td>50 to 55</td>
</tr>
<tr>
<td>Syngonium ‘White Butterfly’</td>
<td>13 to 15.5</td>
<td>55 to 60</td>
</tr>
<tr>
<td>Washingtonia robusta</td>
<td>10 to 15.5</td>
<td>50 to 60</td>
</tr>
<tr>
<td>Yucca elephantipes</td>
<td>10 to 13</td>
<td>50 to 55</td>
</tr>
</tbody>
</table>

<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 weeks.

<sup>3</sup>Plants observed losing about 25 percent quality weekly beyond 2 weeks.

Source: Sea-Land Service, Inc.
Table 3: Recommended Temperature, Relative Humidity and Storage Period for Potted Plants Not Acclimated to Darkness

<table>
<thead>
<tr>
<th>Plant Common name/ Scientific name(s)</th>
<th>Temperature °C</th>
<th>°F</th>
<th>Relative Humidity (percent)</th>
<th>Approximate Storage Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Violet Sainpaulia ionantha</td>
<td>21 to 24</td>
<td>70 to 75</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Aglaonema Aglaonema spp.</td>
<td>16 to 21</td>
<td>60 to 70</td>
<td>65 to 85</td>
<td>10 days</td>
</tr>
<tr>
<td>Asparagus Asparagus densiflorus sprengeri, Asparagus setaceus</td>
<td>18 to 21</td>
<td>65 to 75</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Azalea Rhododendron hybrid</td>
<td>16</td>
<td>60</td>
<td>---</td>
<td>3 days</td>
</tr>
<tr>
<td>Begonia Begonia x hiemalis</td>
<td>16 to 21</td>
<td>60 to 70</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Bromeliads Aechmea fasciata, Neoregelia carolinae tricolor</td>
<td>21 to 27</td>
<td>70 to 80</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Chrysanthenum Chrysanthemum morifolium</td>
<td>2</td>
<td>35</td>
<td>80 to 90</td>
<td>5 days</td>
</tr>
<tr>
<td>Cyclamen Cyclamen persicum giganteum</td>
<td>10</td>
<td>50</td>
<td>80 to 90</td>
<td>4 days</td>
</tr>
<tr>
<td>Dieffenbachia Dieffenbachia spp.</td>
<td>16 to 21</td>
<td>60 to 70</td>
<td>---</td>
<td>5 days</td>
</tr>
<tr>
<td>Dracaena Dracaena spp., Cordyline terminalis</td>
<td>16 to 24</td>
<td>60 to 75</td>
<td>---</td>
<td>7 days</td>
</tr>
<tr>
<td>Easter Lily liliium longiflorum, flower buds puffy, white, unopened</td>
<td>0 to 3</td>
<td>32 to 37</td>
<td>---</td>
<td>14 days</td>
</tr>
<tr>
<td>Ferns Nephrolepis spp., Adiantum raddianum, Asplenium nidus, Pteris cretica, Pteris ensiformis</td>
<td>16 to 24</td>
<td>60 to 75</td>
<td>75 to 85</td>
<td>7 days</td>
</tr>
<tr>
<td>Ficus Ficus spp.</td>
<td>13 to 21</td>
<td>55 to 70</td>
<td>65 to 85</td>
<td>7 days</td>
</tr>
<tr>
<td>Gloxinia Sinningia speciosa</td>
<td>16</td>
<td>60</td>
<td>70 to 90</td>
<td>4 days</td>
</tr>
<tr>
<td>Plant Common name/Scientific name(s)</td>
<td>Temperature °C</td>
<td>Temperature °F</td>
<td>Relative Humidity (percent)</td>
<td>Approximate Storage Life</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Hibiscus Hibiscus rosa-sinensis</td>
<td>18 to 24</td>
<td>65 to 75</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Kalanchoe Kalanchoe blossfeldiana</td>
<td>16</td>
<td>60</td>
<td>---</td>
<td>4 days</td>
</tr>
<tr>
<td>Palm Chrysalidocarpus lutescens, Chamaedorea erumpens, Chamaedorea elagans, Howeia forsteriana, Phoenix roebelenii</td>
<td>10 to 21</td>
<td>50 to 70</td>
<td>65 to 75</td>
<td>10 days</td>
</tr>
<tr>
<td>Pereromia Peperomia spp.</td>
<td>16 to 24</td>
<td>60 to 75</td>
<td>65 to 85</td>
<td>7 days</td>
</tr>
<tr>
<td>Philodendren Philodendron spp.</td>
<td>16 to 24</td>
<td>60 to 75</td>
<td>65 to 85</td>
<td>7 days</td>
</tr>
<tr>
<td>Poinsetta Euphorbia pulcherrima</td>
<td>10 to 12</td>
<td>50 to 54</td>
<td>---</td>
<td>4 days</td>
</tr>
<tr>
<td>Pothos Scindapsus aureus</td>
<td>16 to 24</td>
<td>60 to 75</td>
<td>65 to 85</td>
<td>7 days</td>
</tr>
<tr>
<td>Roses Rosa hybrida</td>
<td>1 to 3</td>
<td>34 to 37</td>
<td>---</td>
<td>5 days</td>
</tr>
<tr>
<td>Schefflera Brassai actinophyllia, Brassai arboracola</td>
<td>13 to 18</td>
<td>55 to 65</td>
<td>---</td>
<td>7 days</td>
</tr>
</tbody>
</table>

*Source: Society of American Florists; McGregor.*
Table 4: Recommended Temperature, Relative Humidity, and Approximate Transit and Storage Period for Cut Flowers and Florist Greens.

<table>
<thead>
<tr>
<th>Product</th>
<th>Temperature °C</th>
<th>Temperature °F</th>
<th>Approximate Storage Life^1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut flowers^2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acacia</td>
<td>4</td>
<td>40</td>
<td>3 to 4 days</td>
</tr>
<tr>
<td>Alstroemeria</td>
<td>4</td>
<td>40</td>
<td>2 to 3 days</td>
</tr>
<tr>
<td>Allium</td>
<td>0 to 2</td>
<td>32 to 35</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Anemone</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>2 days</td>
</tr>
<tr>
<td>Anthurium^4</td>
<td>13</td>
<td>56</td>
<td>2 to 4 weeks</td>
</tr>
<tr>
<td>Aster, China</td>
<td>0 to 4</td>
<td>32 to 40</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Bird-of-paradise</td>
<td>7 to 8</td>
<td>45 to 46</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Bouvardia</td>
<td>0 to 2</td>
<td>32 to 35</td>
<td>1 week</td>
</tr>
<tr>
<td>Buddleia</td>
<td>4</td>
<td>40</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Calendula</td>
<td>4</td>
<td>40</td>
<td>3 to 6 days</td>
</tr>
<tr>
<td>Calla</td>
<td>4</td>
<td>40</td>
<td>1 week</td>
</tr>
<tr>
<td>Camellia^5</td>
<td>7</td>
<td>45</td>
<td>3 to 6 days</td>
</tr>
<tr>
<td>Candytuft</td>
<td>4</td>
<td>40</td>
<td>3 days</td>
</tr>
<tr>
<td>Carnation</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>3 to 4 weeks</td>
</tr>
<tr>
<td>Carnation buds</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>4 to 12 weeks</td>
</tr>
<tr>
<td>Carnation, miniature</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Chrysanthemum</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>3 to 4 weeks</td>
</tr>
<tr>
<td>Clarkia</td>
<td>4</td>
<td>40</td>
<td>3 days</td>
</tr>
<tr>
<td>Columbine</td>
<td>4</td>
<td>40</td>
<td>2 days</td>
</tr>
<tr>
<td>Coreopsis</td>
<td>4</td>
<td>40</td>
<td>3 to 4 days</td>
</tr>
<tr>
<td>Cornflower</td>
<td>4</td>
<td>40</td>
<td>3 days</td>
</tr>
<tr>
<td>Cosmos</td>
<td>4</td>
<td>40</td>
<td>3 to 4 days</td>
</tr>
<tr>
<td>Crocus</td>
<td>0.5 to 2</td>
<td>33 to 36</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Dahlia</td>
<td>4</td>
<td>40</td>
<td>3 to 5 days</td>
</tr>
<tr>
<td>Daisy, English</td>
<td>4</td>
<td>40</td>
<td>3 days</td>
</tr>
<tr>
<td>Daisy, Marguerite</td>
<td>2</td>
<td>36</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Daisy, Shasta</td>
<td>4</td>
<td>40</td>
<td>7 to 8 days</td>
</tr>
<tr>
<td>Delphinium</td>
<td>4</td>
<td>40</td>
<td>1 to 2 days</td>
</tr>
<tr>
<td>Eucharis^5</td>
<td>7 to 10</td>
<td>45 to 50</td>
<td>7 to 10 days</td>
</tr>
<tr>
<td>Feverfew</td>
<td>4</td>
<td>40</td>
<td>3 days</td>
</tr>
<tr>
<td>Forget-me-not</td>
<td>4</td>
<td>40</td>
<td>1 to 2 days</td>
</tr>
<tr>
<td>Foxglove</td>
<td>4</td>
<td>40</td>
<td>1 to 2 days</td>
</tr>
<tr>
<td>Product</td>
<td>Temperature</td>
<td>Approximate Storage Life¹</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
<td>---------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td>°F</td>
<td></td>
</tr>
<tr>
<td>Gaillardia</td>
<td>0 to 0.5</td>
<td>32 to 33</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Gardenia⁶</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Gerbera</td>
<td>1 to 4</td>
<td>34 to 40</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Ginger</td>
<td>13</td>
<td>55</td>
<td>4 to 7 days</td>
</tr>
<tr>
<td>Gladiolus</td>
<td>2 to 5</td>
<td>35 to 42</td>
<td>5 to 8 days</td>
</tr>
<tr>
<td>Gloriosa</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>4 to 7 days</td>
</tr>
<tr>
<td>Godetia</td>
<td>10</td>
<td>50</td>
<td>1 week</td>
</tr>
<tr>
<td>Gypsophila</td>
<td>4</td>
<td>40</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Heather</td>
<td>4</td>
<td>40</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Heliconia</td>
<td>12</td>
<td>54</td>
<td>10 days</td>
</tr>
<tr>
<td>Hyacinth</td>
<td>0 to 0.5</td>
<td>32 to 33</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Iris, bulbous</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Laceflower</td>
<td>4</td>
<td>40</td>
<td>3 days</td>
</tr>
<tr>
<td>Lilac, forced</td>
<td>4</td>
<td>40</td>
<td>4 to 6 days</td>
</tr>
<tr>
<td>Lily</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Lily-of-the-valley</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Lupine</td>
<td>4</td>
<td>40</td>
<td>3 days</td>
</tr>
<tr>
<td>Marigolds</td>
<td>4</td>
<td>40</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Mignonette</td>
<td>4</td>
<td>40</td>
<td>3 to 5 days</td>
</tr>
<tr>
<td>Narcissus</td>
<td>0 to 0.5</td>
<td>32 to 33</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Orchid, cattleya⁴⁵</td>
<td>7 to 10</td>
<td>45 to 50</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Orchid, cymbidium</td>
<td>-0.5 to 4</td>
<td>31 to 40</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Orchid, vanda</td>
<td>13</td>
<td>55</td>
<td>5 days</td>
</tr>
<tr>
<td>Orinthogalum</td>
<td>4</td>
<td>40</td>
<td>4 to 6 weeks</td>
</tr>
<tr>
<td>Poppy</td>
<td>4</td>
<td>40</td>
<td>3 to 5 days</td>
</tr>
<tr>
<td>Peony, tight buds</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>2 to 6 weeks</td>
</tr>
<tr>
<td>Phlox</td>
<td>4</td>
<td>40</td>
<td>1 to 3 days</td>
</tr>
<tr>
<td>Poinsettia</td>
<td>10 to 15</td>
<td>50 to 60</td>
<td>4 to 7 days</td>
</tr>
<tr>
<td>Primrose</td>
<td>4</td>
<td>40</td>
<td>1 to 2 days</td>
</tr>
<tr>
<td>Protea</td>
<td>4</td>
<td>40</td>
<td>7 to 10 days</td>
</tr>
<tr>
<td>Ranunculus</td>
<td>0 to 5</td>
<td>32 to 41</td>
<td>7 to 10 days</td>
</tr>
<tr>
<td>Rose (in preservative)</td>
<td>0.5 to 2</td>
<td>33 to 35</td>
<td>4 to 5 days</td>
</tr>
<tr>
<td>Rose (dry pack)</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Snapdragon</td>
<td>4</td>
<td>40</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Product</td>
<td>Temperature</td>
<td>Approximate Storage Life¹</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------</td>
<td>---------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td>°F</td>
<td></td>
</tr>
<tr>
<td>Snowdrop</td>
<td>4</td>
<td>40</td>
<td>2 to 4 days</td>
</tr>
<tr>
<td>Squill</td>
<td>0 to 0.5</td>
<td>32 to 33</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Statice</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>3 to 4 weeks</td>
</tr>
<tr>
<td>Stephanotis⁵</td>
<td>4</td>
<td>40</td>
<td>1 week</td>
</tr>
<tr>
<td>Stevia</td>
<td>4</td>
<td>40</td>
<td>3 days</td>
</tr>
<tr>
<td>Stock</td>
<td>4</td>
<td>40</td>
<td>3 to 5 days</td>
</tr>
<tr>
<td>Strawflower, fresh</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>3 to 4 weeks</td>
</tr>
<tr>
<td>Sweet pea</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Sweet-william</td>
<td>7</td>
<td>45</td>
<td>3 to 4 days</td>
</tr>
<tr>
<td>Tulip</td>
<td>-0.5 to 0</td>
<td>31 to 32</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Violet</td>
<td>1 to 5</td>
<td>34 to 41</td>
<td>3 to 7 days</td>
</tr>
<tr>
<td>Zinnia</td>
<td>4</td>
<td>40</td>
<td>5 to 7 days</td>
</tr>
<tr>
<td>Florist greens (decorative foliage)²,³</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adiantum (maidenhair)</td>
<td>0 to 4</td>
<td>32 to 40</td>
<td>---</td>
</tr>
<tr>
<td>Asparagus (plumosa)⁶</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Asparagus (sprenger)⁶</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Buxus (boxwood)</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>---</td>
</tr>
<tr>
<td>Camellia</td>
<td>4</td>
<td>40</td>
<td>---</td>
</tr>
<tr>
<td>Cedar</td>
<td>0</td>
<td>32</td>
<td>---</td>
</tr>
<tr>
<td>Chamaedorea</td>
<td>7</td>
<td>45</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Cordyline (ti)</td>
<td>7 to 10</td>
<td>45 to 50</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Croton</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>---</td>
</tr>
<tr>
<td>Dieffenbachia</td>
<td>13</td>
<td>55</td>
<td>---</td>
</tr>
<tr>
<td>Dracaena</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>---</td>
</tr>
<tr>
<td>Dagger &amp; wood ferns⁶</td>
<td>0</td>
<td>32</td>
<td>2 to 3 months</td>
</tr>
<tr>
<td>Eucalyptus</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>1 to 3 weeks</td>
</tr>
<tr>
<td>Galax⁶</td>
<td>0</td>
<td>32</td>
<td>---</td>
</tr>
<tr>
<td>Ground Pine⁶</td>
<td>0</td>
<td>32</td>
<td>---</td>
</tr>
<tr>
<td>Hedera</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>2 to 3 weeks</td>
</tr>
</tbody>
</table>
Table 4: Continued

<table>
<thead>
<tr>
<th>Product</th>
<th>Temperature</th>
<th>Approximate Storage Life&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>Ilex (holly)&lt;sup&gt;6&lt;/sup&gt;</td>
<td>0 to 4</td>
<td>32 to 40</td>
</tr>
<tr>
<td>Juniper</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Leatherleaf (baker fern)</td>
<td>1 to 4</td>
<td>34 to 40</td>
</tr>
<tr>
<td>Leucothoe, drooping</td>
<td>2 to 4</td>
<td>35 to 40</td>
</tr>
<tr>
<td>Magnolia</td>
<td>2 to 4</td>
<td>35 to 40</td>
</tr>
<tr>
<td>Mistletoe</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Mountain-laurel</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Myrtus (myrtle)</td>
<td>2 to 4</td>
<td>35 to 40</td>
</tr>
<tr>
<td>Palm</td>
<td>7</td>
<td>45</td>
</tr>
<tr>
<td>Philodendron</td>
<td>2 to 4</td>
<td>35 to 40</td>
</tr>
<tr>
<td>Pittosporum</td>
<td>2 to 4</td>
<td>35 to 40</td>
</tr>
<tr>
<td>Podocarpus</td>
<td>7</td>
<td>45</td>
</tr>
<tr>
<td>Pothos</td>
<td>2 to 4</td>
<td>35 to 40</td>
</tr>
<tr>
<td>Rhododendron</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Salal (lemon leaf)&lt;sup&gt;6&lt;/sup&gt;</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Scotch-broom</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Smilax, southern&lt;sup&gt;6&lt;/sup&gt;</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Staghorn fern</td>
<td>13</td>
<td>55</td>
</tr>
<tr>
<td>Vaccinium (huckleberry)&lt;sup&gt;6&lt;/sup&gt;</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Woodwardia fern</td>
<td>0 to 4</td>
<td>32 to 40</td>
</tr>
</tbody>
</table>

<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 weeks. 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.

Table 5: Recommended Temperature and Relative Humidity, and Approximate Transit and Storage Life for Seafood, Meat, Dairy, and Egg Products.

<table>
<thead>
<tr>
<th>Product</th>
<th>Temperature °C</th>
<th>Relative Humidity (percent)</th>
<th>Approx. Storage Life</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fish</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haddock, Cod, Perch</td>
<td>-1 to 1</td>
<td>31 to 34</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Hake, Whiting</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Halibut</td>
<td>-1 to 4</td>
<td>31 to 34</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Herring, kipperd, smkd</td>
<td>0 to 2</td>
<td>32 to 36</td>
<td>80 to 90</td>
</tr>
<tr>
<td>Mackerel</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Menhaden</td>
<td>1 to 5</td>
<td>34 to 41</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Salmon</td>
<td>-1 to 1</td>
<td>31 to 34</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Tuna</td>
<td>0 to 2</td>
<td>32 to 36</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Frozen fish</td>
<td>-29 to -20</td>
<td>-20 to -4</td>
<td>90 to 95</td>
</tr>
<tr>
<td><strong>Shellfish</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scallop meat</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Shrimp</td>
<td>-1 to 1</td>
<td>31 to 34</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Lobster, American</td>
<td>5 to 10</td>
<td>41 to 50</td>
<td>in water</td>
</tr>
<tr>
<td>Oysters, clams meat, liq</td>
<td>0 to 2</td>
<td>32 to 36</td>
<td>100</td>
</tr>
<tr>
<td>Oysters, clams, in shell</td>
<td>5 to 10</td>
<td>41 to 50</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Frozen shellfish</td>
<td>-29 to -20</td>
<td>-20 to -4</td>
<td>90 to 95</td>
</tr>
<tr>
<td><strong>Meat (beef)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef, fresh, average</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>88 to 92</td>
</tr>
<tr>
<td>Beef, carcass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choice, 60% lean</td>
<td>0 to 4</td>
<td>32 to 39</td>
<td>85 to 90</td>
</tr>
<tr>
<td>Prime, 54% lean</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>85</td>
</tr>
<tr>
<td>Sirloin, Round cut</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>85</td>
</tr>
<tr>
<td>Dried, chipped</td>
<td>10 to 15</td>
<td>50 to 59</td>
<td>15</td>
</tr>
<tr>
<td>Liver</td>
<td>0</td>
<td>32</td>
<td>90</td>
</tr>
<tr>
<td>Veal, 81% lean</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>90</td>
</tr>
<tr>
<td>Frozen beef</td>
<td>-23 to -18</td>
<td>-10 to 0</td>
<td>90 to 95</td>
</tr>
<tr>
<td><strong>Meat (pork)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pork, fresh, average</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>85 to 90</td>
</tr>
<tr>
<td>Carcass, 47% lean</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>85 to 90</td>
</tr>
<tr>
<td>Bellies, 35% lean</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>85</td>
</tr>
<tr>
<td>Backfat, 100% lean</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>90 to 95</td>
</tr>
<tr>
<td>Frozen pork</td>
<td>-23 to -18</td>
<td>-10 to 0</td>
<td>90 to 95</td>
</tr>
<tr>
<td>Product</td>
<td>Temperature</td>
<td>Relative Humidity (percent)</td>
<td>Approx. Storage Life</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------</td>
<td>----------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>Meat (pork) cont.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ham</td>
<td>0</td>
<td>32</td>
<td>95 to 100</td>
</tr>
<tr>
<td>74% lean</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>80 to 85</td>
</tr>
<tr>
<td>Light cure</td>
<td>3 to 5</td>
<td>37 to 41</td>
<td>80 to 85</td>
</tr>
<tr>
<td>Country cure</td>
<td>10 to 15</td>
<td>50 to 59</td>
<td>65 to 70</td>
</tr>
<tr>
<td>Frozen</td>
<td>-23 to -18</td>
<td>-10 to 0</td>
<td>90 to 95</td>
</tr>
<tr>
<td><strong>Bacon</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium fat class</td>
<td>3 to 5</td>
<td>37 to 41</td>
<td>80 to 85</td>
</tr>
<tr>
<td>Cured, farm style</td>
<td>16 to 18</td>
<td>61 to 64</td>
<td>85</td>
</tr>
<tr>
<td>Cured, packer style</td>
<td>1 to 4</td>
<td>34 to 39</td>
<td>85</td>
</tr>
<tr>
<td>Frozen</td>
<td>-23 to -18</td>
<td>-10 to 0</td>
<td>90 to 95</td>
</tr>
<tr>
<td><strong>Sausage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Links or bulk</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>85</td>
</tr>
<tr>
<td>Country, smoked</td>
<td>0</td>
<td>32</td>
<td>85</td>
</tr>
<tr>
<td>Frankfurters, average</td>
<td>0</td>
<td>32</td>
<td>85</td>
</tr>
<tr>
<td>Polish style</td>
<td>0</td>
<td>32</td>
<td>85</td>
</tr>
<tr>
<td><strong>Meat (lamb)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh, average</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>85 to 90</td>
</tr>
<tr>
<td>Choice, 67% lean</td>
<td>0</td>
<td>32</td>
<td>85</td>
</tr>
<tr>
<td>Leg, choice, 83% lean</td>
<td>0</td>
<td>32</td>
<td>95</td>
</tr>
<tr>
<td>Frozen</td>
<td>-23 to -18</td>
<td>-10 to 0</td>
<td>90 to 95</td>
</tr>
<tr>
<td><strong>Meat (poultry)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poultry, fresh, average</td>
<td>-2 to 0</td>
<td>28 to 32</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Chicken, all classes</td>
<td>-2 to 0</td>
<td>28 to 32</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Turkey, all classes</td>
<td>-2 to 0</td>
<td>28 to 32</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Duck</td>
<td>-2 to 0</td>
<td>28 to 32</td>
<td>95 to 100</td>
</tr>
<tr>
<td>Poultry, frozen</td>
<td>-23 to -18</td>
<td>-10 to 0</td>
<td>90 to 95</td>
</tr>
<tr>
<td><strong>Rabbit meat, fresh</strong></td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>90 to 95</td>
</tr>
<tr>
<td><strong>Dairy products</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butter</td>
<td>0</td>
<td>32</td>
<td>75 to 85</td>
</tr>
<tr>
<td>Butter, frozen</td>
<td>-23</td>
<td>-10</td>
<td>70 to 85</td>
</tr>
</tbody>
</table>
Table 5: Continued

<table>
<thead>
<tr>
<th>Product</th>
<th>Temperature</th>
<th>Relative Humidity</th>
<th>Approx. Storage Life</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>°F</td>
<td>(percent)</td>
</tr>
<tr>
<td>Dairy products cont.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheese</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheddar</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>65</td>
</tr>
<tr>
<td>Brick</td>
<td>-1 to 1</td>
<td>30 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Camembert</td>
<td>-1 to 1</td>
<td>30 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Cottage</td>
<td>-1 to 1</td>
<td>30 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Cream</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Limburger</td>
<td>-1 to 1</td>
<td>30 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Neufchatel</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Process American</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>---</td>
</tr>
<tr>
<td>Process Brick</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>---</td>
</tr>
<tr>
<td>Process Limburger</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>---</td>
</tr>
<tr>
<td>Process Swiss</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>---</td>
</tr>
<tr>
<td>Roquefort</td>
<td>-1 to 1</td>
<td>30 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Swiss</td>
<td>-1 to 1</td>
<td>30 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Cheese foods</td>
<td>4 to 7</td>
<td>40 to 45</td>
<td>---</td>
</tr>
<tr>
<td>Ice Cream, 10% fat</td>
<td>-29 to -26</td>
<td>-20 to -15</td>
<td>---</td>
</tr>
<tr>
<td>Milk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole, past, Gr. A</td>
<td>0 to 1</td>
<td>32 to 34</td>
<td>---</td>
</tr>
<tr>
<td>Dried, whole</td>
<td>7 to 21</td>
<td>45 to 70</td>
<td>low</td>
</tr>
<tr>
<td>Dried, non-fat</td>
<td>7 to 21</td>
<td>45 to 70</td>
<td>low</td>
</tr>
<tr>
<td>Evaporated</td>
<td>4</td>
<td>40</td>
<td>---</td>
</tr>
<tr>
<td>Evaporated, unsweetened</td>
<td>21</td>
<td>70</td>
<td>---</td>
</tr>
<tr>
<td>Condensed, sweetened</td>
<td>7</td>
<td>40</td>
<td>---</td>
</tr>
<tr>
<td>Whey, dried</td>
<td>21</td>
<td>70</td>
<td>low</td>
</tr>
<tr>
<td>Eggs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell</td>
<td>-2 to 0</td>
<td>29 to 32</td>
<td>80 to 85</td>
</tr>
<tr>
<td>Frozen</td>
<td>0</td>
<td>32</td>
<td>---</td>
</tr>
</tbody>
</table>

Source: American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc.
<table>
<thead>
<tr>
<th>Product</th>
<th>Temperature °C</th>
<th>Temperature °F</th>
<th>Relative Humidity (percent)</th>
<th>Approx. Storage Life</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Candy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk chocolate</td>
<td>-18 to 1</td>
<td>0 to 34</td>
<td>40</td>
<td>6 to 12 months</td>
</tr>
<tr>
<td>Peanut brittle</td>
<td>-18 to 1</td>
<td>0 to 34</td>
<td>40</td>
<td>1 to 6 months</td>
</tr>
<tr>
<td>Fudge</td>
<td>-18 to 1</td>
<td>0 to 34</td>
<td>65</td>
<td>5 to 12 months</td>
</tr>
<tr>
<td>Marshmallows</td>
<td>-18 to 1</td>
<td>0 to 34</td>
<td>65</td>
<td>3 to 9 months</td>
</tr>
<tr>
<td><strong>Other Products</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alfalfa meal</td>
<td>-18</td>
<td>0</td>
<td>70 to 75</td>
<td>1 year plus</td>
</tr>
<tr>
<td><strong>Beer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keg</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>---</td>
<td>3 to 8 weeks</td>
</tr>
<tr>
<td>Bottles, cans</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>65</td>
<td>3 to 6 months</td>
</tr>
<tr>
<td>Bread</td>
<td>-18</td>
<td>0</td>
<td>---</td>
<td>3 to 13 weeks</td>
</tr>
<tr>
<td>Canned goods</td>
<td>0 to 16</td>
<td>32 to 60</td>
<td>70</td>
<td>1 year</td>
</tr>
<tr>
<td>Cocoa</td>
<td>0 to 4</td>
<td>32 to 40</td>
<td>50 to 70</td>
<td>1 year plus</td>
</tr>
<tr>
<td>Coffee, green</td>
<td>2 to 3</td>
<td>35 to 37</td>
<td>80 to 85</td>
<td>2 to 4 months</td>
</tr>
<tr>
<td>Fur and fabrics</td>
<td>1 to 4</td>
<td>34 to 40</td>
<td>45 to 55</td>
<td>Several years</td>
</tr>
<tr>
<td>Honey</td>
<td>10</td>
<td>50</td>
<td>---</td>
<td>1 year plus</td>
</tr>
<tr>
<td>Hops</td>
<td>-2 to 0</td>
<td>28 to 32</td>
<td>50 to 60</td>
<td>Several months</td>
</tr>
<tr>
<td>Lard, w/o antioxidant</td>
<td>7</td>
<td>45</td>
<td>90 to 95</td>
<td>4 to 8 months</td>
</tr>
<tr>
<td>Maple syrup</td>
<td>-18</td>
<td>0</td>
<td>90 to 95</td>
<td>12 to 14</td>
</tr>
<tr>
<td>Nuts</td>
<td>0 to 10</td>
<td>32 to 50</td>
<td>65 to 75</td>
<td>8 to 12 months</td>
</tr>
<tr>
<td>Oil, vegetable, salad</td>
<td>21</td>
<td>70</td>
<td>---</td>
<td>1 year plus</td>
</tr>
<tr>
<td>Oleomargarine</td>
<td>2</td>
<td>32</td>
<td>60 to 70</td>
<td>1 year plus</td>
</tr>
<tr>
<td>Orange Juice</td>
<td>-1 to 2</td>
<td>30 to 35</td>
<td>---</td>
<td>3 to 6 weeks</td>
</tr>
<tr>
<td>Popcorn, unpopped</td>
<td>0 to 4</td>
<td>32 to 40</td>
<td>85</td>
<td>4 to 6 weeks</td>
</tr>
<tr>
<td>Yeast, baker's comp</td>
<td>-1 to 0</td>
<td>31 to 32</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Tobacco</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hogshead</td>
<td>10 to 18</td>
<td>50 to 65</td>
<td>50 to 65</td>
<td>1 year</td>
</tr>
<tr>
<td>Bales</td>
<td>2 to 4</td>
<td>35 to 40</td>
<td>70 to 85</td>
<td>1 to 2 years</td>
</tr>
<tr>
<td>Cigarettes</td>
<td>2 to 8</td>
<td>35 to 46</td>
<td>50 to 55</td>
<td>6 months</td>
</tr>
<tr>
<td>Cigars</td>
<td>2 to 10</td>
<td>35 to 50</td>
<td>60 to 65</td>
<td>2 months</td>
</tr>
</tbody>
</table>

Source: *American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc.*
Table 7: Products Sensitive to Chilling Injury

<table>
<thead>
<tr>
<th>Product</th>
<th>Product</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>atemoya</td>
<td>grapefruit</td>
<td>plantain</td>
</tr>
<tr>
<td>avocados</td>
<td>guava</td>
<td>pomegranates</td>
</tr>
<tr>
<td>babaco</td>
<td>haricot vert</td>
<td>potatoes</td>
</tr>
<tr>
<td>bananas</td>
<td>jatroctaba</td>
<td>potted plants</td>
</tr>
<tr>
<td>beans</td>
<td>jackfruit</td>
<td>pummelo</td>
</tr>
<tr>
<td>bitter melon</td>
<td>jicama</td>
<td>pumpkins</td>
</tr>
<tr>
<td>black sapote</td>
<td>kiwano</td>
<td>rambutan</td>
</tr>
<tr>
<td>boniato</td>
<td>langsat</td>
<td>santol</td>
</tr>
<tr>
<td>breadfruit</td>
<td>lemons</td>
<td>sapodilla</td>
</tr>
<tr>
<td>calabaza</td>
<td>limes</td>
<td>soursop</td>
</tr>
<tr>
<td>calamondin</td>
<td>malanga</td>
<td>squash</td>
</tr>
<tr>
<td>canistel</td>
<td>mamey</td>
<td>sugar apple</td>
</tr>
<tr>
<td>cantaloup</td>
<td>mangoes</td>
<td>sweet potatoes</td>
</tr>
<tr>
<td>carambola</td>
<td>mangosteen</td>
<td>tamarillo</td>
</tr>
<tr>
<td>chayote</td>
<td>melons</td>
<td>tamarind</td>
</tr>
<tr>
<td>cherimoya</td>
<td>okra</td>
<td>taro root</td>
</tr>
<tr>
<td>cranberries</td>
<td>olive</td>
<td>tomatillo</td>
</tr>
<tr>
<td>cucumbers</td>
<td>oranges (CA &amp; AZ)</td>
<td>tomatoes</td>
</tr>
<tr>
<td>custard apple</td>
<td>papaya</td>
<td>tropical flowers</td>
</tr>
<tr>
<td>eggplant</td>
<td>passion fruit</td>
<td>ugli fruit</td>
</tr>
<tr>
<td>feijoa</td>
<td>pepino</td>
<td>watermelon</td>
</tr>
<tr>
<td>ginger root</td>
<td>peppers</td>
<td>yam</td>
</tr>
<tr>
<td>granadilla</td>
<td>pineapples</td>
<td></td>
</tr>
</tbody>
</table>

Source: Hardenburg, Watada, and Wang; McGregor.
Table 8: Products Susceptible to Freezing Injury

<table>
<thead>
<tr>
<th>Most Susceptible</th>
<th>Moderately Susceptible</th>
<th>Least Susceptible</th>
</tr>
</thead>
<tbody>
<tr>
<td>apricots</td>
<td>eggplant</td>
<td>peppers, sweet</td>
</tr>
<tr>
<td>eggplant</td>
<td>lemons</td>
<td>plums</td>
</tr>
<tr>
<td>avocados</td>
<td>lettuce</td>
<td>potatoes</td>
</tr>
<tr>
<td>bananas</td>
<td>limes</td>
<td>squash, summer</td>
</tr>
<tr>
<td>beans, snap</td>
<td>okra</td>
<td>sweetpotatoes</td>
</tr>
<tr>
<td>berries (except cranberries)</td>
<td>peaches</td>
<td>tomatoes</td>
</tr>
<tr>
<td>cucumbers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 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 dates   | parsnips                             | turnips w/o tops                  |

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).

Table 9: Top-Icing of Products

<table>
<thead>
<tr>
<th>Should be Top-Iced</th>
<th>Can be Top-Iced</th>
</tr>
</thead>
<tbody>
<tr>
<td>beets with tops</td>
<td>artichokes, globe</td>
</tr>
<tr>
<td>broccoli</td>
<td>beet greens</td>
</tr>
<tr>
<td>carrots with tops</td>
<td>beets, topped</td>
</tr>
<tr>
<td>corn, sweet</td>
<td>brussels sprouts</td>
</tr>
<tr>
<td>endive</td>
<td>cantaloups</td>
</tr>
<tr>
<td>escarole</td>
<td>carrots, topped</td>
</tr>
<tr>
<td>green onions</td>
<td>celeriac</td>
</tr>
<tr>
<td>parsley</td>
<td>chard</td>
</tr>
<tr>
<td>radishes with tops</td>
<td>kohlrabi</td>
</tr>
<tr>
<td>turnips with tops</td>
<td>leeks</td>
</tr>
<tr>
<td>watercress</td>
<td>mustard greens</td>
</tr>
<tr>
<td>radish greens</td>
<td>parsnips</td>
</tr>
<tr>
<td>spinach</td>
<td>radishes</td>
</tr>
<tr>
<td>turnip greens</td>
<td>rutabagas</td>
</tr>
<tr>
<td>turnips</td>
<td></td>
</tr>
</tbody>
</table>

Source: Safeway Stores, Inc.
Table 10: Moisture Loss Rate of Products

<table>
<thead>
<tr>
<th>High Loss Rate</th>
<th>Medium Loss Rate</th>
<th>Low Loss Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>apricots</td>
<td>avocados</td>
<td>apples</td>
</tr>
<tr>
<td>blackberries</td>
<td>artichokes*</td>
<td>cauliflower, wrapped</td>
</tr>
<tr>
<td>broccoli*</td>
<td>asparagus</td>
<td>cucumbers, waxed</td>
</tr>
<tr>
<td>cantaloups*</td>
<td>bananas</td>
<td>eggplant</td>
</tr>
<tr>
<td>chard*</td>
<td>beets*</td>
<td>garlic</td>
</tr>
<tr>
<td>cherries</td>
<td>brussels sprouts*</td>
<td>ginger root</td>
</tr>
<tr>
<td>Chinese vegetables</td>
<td>cabbage*</td>
<td>kiwifruit</td>
</tr>
<tr>
<td>figs</td>
<td>carrots, topped*</td>
<td>melons</td>
</tr>
<tr>
<td>grapes</td>
<td>cauliflower, unwrapped</td>
<td>onions, dry</td>
</tr>
<tr>
<td></td>
<td>celeriac*</td>
<td>potatoes</td>
</tr>
<tr>
<td></td>
<td>celery*</td>
<td>pumpkins</td>
</tr>
<tr>
<td></td>
<td>coconuts</td>
<td>squash, winter (hard shell)</td>
</tr>
<tr>
<td></td>
<td>corn, sweet*</td>
<td>squash, summer (soft shell)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tangerines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tomatoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>yams</td>
</tr>
</tbody>
</table>

* Can be top-iced.

Source: Safeway Stores, Inc.
Table 11: Products That are Ethylene Producers or Ethylene Sensitive

<table>
<thead>
<tr>
<th>Ethylene producers</th>
<th>Ethylene sensitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>apples</td>
<td>cut flowers</td>
</tr>
<tr>
<td>apricots</td>
<td>eggplant</td>
</tr>
<tr>
<td>avocados</td>
<td>florist greens</td>
</tr>
<tr>
<td>bananas, ripening</td>
<td>green beans</td>
</tr>
<tr>
<td>cantaloups</td>
<td>kiwifruit, unripe</td>
</tr>
<tr>
<td>cherimoya</td>
<td>leafy greens</td>
</tr>
<tr>
<td>figs</td>
<td>lettuce</td>
</tr>
<tr>
<td>guavas</td>
<td>okra</td>
</tr>
<tr>
<td>honeydew melons</td>
<td>parsley</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: *Safeway Stores, Inc.; McGregor; Sea-Land Service, Inc.*
<table>
<thead>
<tr>
<th>Odor produced by</th>
<th>Will be absorbed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>apples</td>
<td>cabbage, carrots, celery, figs, onions, meat, eggs, dairy products</td>
</tr>
<tr>
<td>avocados</td>
<td>pineapples</td>
</tr>
<tr>
<td>carrots</td>
<td>celery</td>
</tr>
<tr>
<td>citrus fruit</td>
<td>meat, eggs, dairy products</td>
</tr>
<tr>
<td>ginger root</td>
<td>eggplant</td>
</tr>
<tr>
<td>grapes fumigated with sulfur dioxide</td>
<td>other fruits and vegetables</td>
</tr>
<tr>
<td>leeks</td>
<td>figs, grapes</td>
</tr>
<tr>
<td>onions, dry</td>
<td>apples, celery, pears</td>
</tr>
<tr>
<td>onions, green</td>
<td>corn, figs, grapes, mushrooms, rhubarb</td>
</tr>
<tr>
<td>pears</td>
<td>cabbage, carrots, celery, onions, potatoes</td>
</tr>
<tr>
<td>potatoes</td>
<td>apples, pears</td>
</tr>
<tr>
<td>peppers, green</td>
<td>pineapples</td>
</tr>
<tr>
<td>&quot;strongly scented vegetables&quot;</td>
<td>citrus fruit</td>
</tr>
</tbody>
</table>

### Table 13: 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.

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fruits and vegetables, 0 to 2°C (32 to 36°F), 90-95 percent relative humidity.</strong> Many products in this group produce ethylene.</td>
<td><strong>Fruits and vegetables, 0 to 2°C (32 to 36°F), 95-100 percent relative humidity.</strong> Many products in this group are sensitive to ethylene.</td>
<td><strong>Fruits and vegetables, 0 to 2°C (32 to 36°F), 65-75 percent relative humidity.</strong> Moisture will damage these products.</td>
</tr>
<tr>
<td>apples</td>
<td>grapes (without sulfur dioxide)</td>
<td>onions, dry</td>
</tr>
<tr>
<td>apricots</td>
<td>horseradish</td>
<td>garlic</td>
</tr>
<tr>
<td>Asian pears</td>
<td>kohlrabi</td>
<td>onions, green' (not with figs, grapes, mushrooms, rhubarb, or corn)</td>
</tr>
<tr>
<td>Barbados cherry</td>
<td>leeks</td>
<td>leafy greens</td>
</tr>
<tr>
<td>beets, topped</td>
<td>longan</td>
<td>leeks' (not with figs or grapes)</td>
</tr>
<tr>
<td>berries (except cranberries)</td>
<td>loquat</td>
<td>lettuce</td>
</tr>
<tr>
<td>cashew apple</td>
<td>lychee</td>
<td>mushrooms</td>
</tr>
<tr>
<td>cherries</td>
<td>mushrooms</td>
<td>oranges' (FL &amp; TX)</td>
</tr>
<tr>
<td>coconuts</td>
<td>nectarines</td>
<td>plums</td>
</tr>
<tr>
<td>figs (not with apples)</td>
<td>oranges' (FL &amp; TX)</td>
<td>pomegranates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prunes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>quinces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>radishes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rutabagas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>turnips</td>
</tr>
</tbody>
</table>

1Citrus treated with biphenyl may give odors to other products.

1These products can be top-iced.
Group 4: Fruits and vegetables, 4.5°C (40°F), 90-95 percent relative humidity.

<table>
<thead>
<tr>
<th>Fruits and vegetables</th>
<th>Fruits and vegetables</th>
<th>Fruits and vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>cactus leaves</td>
<td>lemons¹</td>
<td>tamarillo</td>
</tr>
<tr>
<td>cactus pears</td>
<td>lychees</td>
<td>tangerines³</td>
</tr>
<tr>
<td>caimito</td>
<td>kumquat</td>
<td></td>
</tr>
<tr>
<td>cantaloups²</td>
<td>mandarin¹</td>
<td>ugli fruit¹</td>
</tr>
<tr>
<td>clementine</td>
<td>oranges¹ (CA and AZ)</td>
<td>yucca root</td>
</tr>
<tr>
<td>cranberries</td>
<td>pepino</td>
<td></td>
</tr>
</tbody>
</table>

¹Citrus treated with biphenyl may give odors to other products.
²Can 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.

<table>
<thead>
<tr>
<th>Fruits and vegetables</th>
<th>Fruits and vegetables</th>
<th>Fruits and vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>beans</td>
<td>kiwano</td>
<td>potatoes, storage</td>
</tr>
<tr>
<td>calamondin</td>
<td>malanga</td>
<td>pummelo</td>
</tr>
<tr>
<td>chayote</td>
<td>okra</td>
<td>squash, summer (soft shell)</td>
</tr>
<tr>
<td>cucumber</td>
<td>olive</td>
<td>tamarind</td>
</tr>
<tr>
<td>eggplant</td>
<td>peppers</td>
<td>taro root</td>
</tr>
<tr>
<td>haricot vert</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Fruits and vegetables</th>
<th>Fruits and vegetables</th>
<th>Fruits and vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>atemoya</td>
<td>ginger root</td>
<td>papayas</td>
</tr>
<tr>
<td>avocados</td>
<td>granadilla</td>
<td>passionfruit</td>
</tr>
<tr>
<td>babaco</td>
<td>grapefruit</td>
<td>pineapple</td>
</tr>
<tr>
<td>bananas</td>
<td>guava</td>
<td>plantain</td>
</tr>
<tr>
<td>bitter melon</td>
<td>jaboticaba</td>
<td>potatoes, new</td>
</tr>
<tr>
<td>black sapote</td>
<td>jackfruit</td>
<td>pumpkin</td>
</tr>
<tr>
<td>boniato</td>
<td>langsat</td>
<td>rambutan</td>
</tr>
<tr>
<td>breadfruit</td>
<td>lemons¹</td>
<td>santol</td>
</tr>
<tr>
<td>canistel</td>
<td>limes¹</td>
<td>soursop</td>
</tr>
<tr>
<td>carambola</td>
<td>mamey</td>
<td>sugar apple</td>
</tr>
<tr>
<td>cherimoya</td>
<td>mangoes</td>
<td>squash, winter (hard shell)</td>
</tr>
<tr>
<td>coconuts</td>
<td>mangosteen</td>
<td>tomatillos</td>
</tr>
<tr>
<td>feijoa</td>
<td>melons (except cantaloups)</td>
<td>tomatoes, ripe</td>
</tr>
</tbody>
</table>

¹Citrus 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)
watermelon¹
sweetpotatoes¹

¹separate 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**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>allium</td>
<td>freesia</td>
<td>peony, tight buds</td>
<td></td>
</tr>
<tr>
<td>aster, China</td>
<td>gardenia</td>
<td>ranunculus</td>
<td></td>
</tr>
<tr>
<td>bouvardia</td>
<td>hyacinth</td>
<td>rose</td>
<td></td>
</tr>
<tr>
<td>carnation</td>
<td>iris, bulbous</td>
<td>squill</td>
<td></td>
</tr>
<tr>
<td>chrysanthemum</td>
<td>lily</td>
<td>sweet pea</td>
<td></td>
</tr>
<tr>
<td>crocus</td>
<td>lily-of-the-valley</td>
<td>tulip</td>
<td></td>
</tr>
<tr>
<td>cymbidium orchid</td>
<td>narcissus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Florist Greens**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>adiantum (maidenhair)</td>
<td>woodwardia fern</td>
<td>mountain-laurel</td>
<td></td>
</tr>
<tr>
<td>cedar</td>
<td>ground pine</td>
<td>rhododendren</td>
<td></td>
</tr>
<tr>
<td>dagger and wood</td>
<td>ilex (holly)</td>
<td>salal (lemon leaf)</td>
<td></td>
</tr>
<tr>
<td>ferns</td>
<td>juniper</td>
<td>vaccinium (huckleberry)</td>
<td></td>
</tr>
<tr>
<td>galax</td>
<td>mistletoe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Group 9: Flowers and florist greens, 4.5°C (40°F), 90-95 percent relative humidity.

**Flowers**

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

**Florist Greens**

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

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

**Flowers**

- anemone
- bird-of-paradise
- camellia
- eucharis
- gloriosa
- godetia

**Florist Greens**

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

**Flowers**
anthurium heiconia poinsettia
ginger orchid, vanda

**Florist Greens**
dieffenbachia staghorn fern

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

Source: Maersk Line
Table 15: 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.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Capacity: 393 ft³</td>
<td>Int. Capacity: 316 ft³</td>
</tr>
<tr>
<td>Ext. Dim.: 88 by 125 by 87 in</td>
<td>Ext. Dim.: 25 by 60.4 by 64 in</td>
</tr>
<tr>
<td>Max. Gross Weight: 13,300 lb</td>
<td>Max. Gross Weight: 5,680 lb</td>
</tr>
<tr>
<td>Cube Displacement: 425 ft³</td>
<td>Cube Displacement: 339 ft³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type: A2, A3 Dom./AAA-SAA Intl.</th>
<th>TYPE: LD7, LD9 Dom./AAP-AAR Intl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Capacity: 440 ft³</td>
<td>Int. Capacity: 355 ft³</td>
</tr>
<tr>
<td>Ext. Dim.: 88 by 125 by 87 in</td>
<td>Ext. Dim.: 125 by 88 by 64 in</td>
</tr>
<tr>
<td>Max. Gross Weight: 12,500 lb</td>
<td>Max. Gross Weight: 13,300 lb</td>
</tr>
<tr>
<td>Cube Displacement: 475 ft³</td>
<td>Cube Displacement: 401 ft³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE: FTC Dom./=</th>
<th>TYPE: LD8 Dom./ALE Intl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Capacity: 151 ft³</td>
<td>Int. Capacity: 253 ft³</td>
</tr>
<tr>
<td>Ext. Dim.: 81 by 60.4 by 62.75 in</td>
<td>Ext. Dim.: 196 by 60.4 by 60 in</td>
</tr>
<tr>
<td>Max. Gross Weight: 4,500 lb</td>
<td>Max. Gross Weight: 5,400 lb</td>
</tr>
<tr>
<td>Cube Displacement: 174.5 ft³</td>
<td>Cube Displacement: 280 ft³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE: LD2 Dom./APA Intl.</th>
<th>TYPE: LD10 Dom./AWR-AWS Intl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Capacity: 120 ft³</td>
<td>Int. Capacity: 246 ft³</td>
</tr>
<tr>
<td>Ext. Dim.: 47 by 60.4 by 64 in</td>
<td>Ext. Dim.: 125 by 60.4 by 64 in</td>
</tr>
<tr>
<td>Max. Gross Weight: 2,700 lb</td>
<td>Max. Gross Weight: 5,680 lb</td>
</tr>
<tr>
<td>Cube Displacement: 134 ft</td>
<td>Cube Displacement: 76 ft³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE: LD3 Dom./AVE-AKE Intl.</th>
<th>TYPE: LDW Dom./=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Capacity: 150 ft³</td>
<td>Int. Capacity: 70 ft³</td>
</tr>
<tr>
<td>Ext. Dim.: 79 by 60.4 by 64 in</td>
<td>Ext. Dim.: 98 by 42.2 by 41.6 in</td>
</tr>
<tr>
<td>Max. Gross Weight: 3,500 lb</td>
<td>Max. Gross Weight: 1,700 lb</td>
</tr>
<tr>
<td>Cube Displacement: 166 ft³</td>
<td>Cube Displacement: 76 ft³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE: LD4 Dom./DLP-DLF Intl.</th>
<th>TYPE: M1 Dom./ARA Intl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Capacity: 193 ft³</td>
<td>Int. Capacity: 572 ft³</td>
</tr>
<tr>
<td>Ext. Dim.: 96 by 60.4 by 64 in</td>
<td>Ext. Dim.: 125 by 96 by 96 in</td>
</tr>
<tr>
<td>Max. Gross Weight: 5,400 lb</td>
<td>Max. Gross Weight: 15,000 lb</td>
</tr>
<tr>
<td>Cube Displacement: 215 ft³</td>
<td>Cube Displacement: 666 ft³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE: LD5, LD11 Dom./AWB-AWD Intl.</th>
<th>TYPE: M2 Dom./ASE-ASG Intl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Capacity: 265 ft³</td>
<td>Int. Capacity: 1,077 ft³</td>
</tr>
<tr>
<td>Ext. Dim.: 125 by 60 by 64 in</td>
<td>Ext. Dim.: 240 by 96 by 96 in</td>
</tr>
<tr>
<td>Max. Gross Weight: 7,000 lb</td>
<td>Max. Gross Weight: 25,000 lb</td>
</tr>
<tr>
<td>Cube Displacement: 265 ft³</td>
<td>Cube Displacement: 1,286 ft³</td>
</tr>
</tbody>
</table>

Source: *Air Cargo from A to Z*
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.
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.
Government Regulations

The Shipping Act of 1984 has a broad regulatory scope, embracing a wide range of maritime activities. The act affects ocean ports, marine terminal operators, freight forwarders, importers, and exporters. The primary objective of the act is to regulate international ocean common carriers operating to or from U.S. shores. The ocean common carrier (or liner) industry is comprised of domestic and foreign firms that operate vessels on regularly scheduled routes between the United States and foreign ports. Typically, modern liner carriers operate containerships that are designed to transport cargo stowed in 20- to 45-foot ocean-shipping containers.

Carriers that operate on a single shipment contract (trip) or time charter basis (e.g., bulk grain, oil, coal) are generally not affected by the act. The contractual nature of their business precludes them from common carrier regulation. In addition, the scope of the act does not include maritime labor agreements, the carriage of goods on domestic waterways (cabotage), or maritime cargo preference programs.

The Shipping Act of 1984 has three declared purposes: (1) To establish a nondiscriminatory regulatory process for the common carriage of goods in foreign commerce; (2) to provide an efficient and economic ocean transport system that is in harmony with international practices; and (3) to encourage the development of the U.S.-flag liner fleet.

A primary function of the act is to grant antitrust immunity to ocean common carrier conferences. Carriers formulate 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 cannot challenge the formation of conference agreements, but the Federal Maritime Commission (FMC) can seek injunctive relief for any agreements that it considers to be substantially anticompetitive.

Conferences tend to limit their activities to a specific import or export trade route. The objective is to increase carrier revenue by regulating the price and availability of transportation services in that geographic region. Carriers can choose to operate independently and not join the conference, but the U.S.-outbound conferences presently control about 50 to 70 percent of all outbound vessel capacity. Conferences are required by the act to have open membership. Presently, most conferences are comprised mainly of foreign-flag carriers.

In addition to antitrust provisions, the act establishes rules for filing ocean freight tariffs. Common carriers are required to file tariffs with the FMC and make them available for public inspection. The tariffs must contain all
of the rates, rules, and services offered by each carrier and conference. Intermodal rates that include charges for the inland movement of cargo to and from ports are also filed in the tariff. In addition to the base rate, carriers frequently include bunker fuel, currency adjustment, terminal handling, and port congestion surcharges in the tariff. However, four groups of commodities are exempt from tariff filing requirements: bulk cargo, forest products, recycled metal scrap, and wastepaper. It is illegal for carriers to offer rates that are not published in the tariff.

Ocean common carriers are prohibited from engaging "in any unfair or unjustly discriminatory practice in the manner of rates." However, the Shipping Act of 1984 does not provide the FMC or shippers with authority to challenge the "reasonableness" or "fairness" of carrier tariff rate increases. The Shipping Act of 1916 granted the FMC the authority to review the "reasonableness" of proposed rate increases and establish maximum freight charges. The 1984 act simply requires that the FMC ensure that both shippers and carriers adhere to the published tariff rates and rules.

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, where an FMC investigation has revealed numerous violations.

The framers of the act attempted to balance both shipper and carrier interests. Although the act affords a great deal of latitude to carriers to form agreements and operate collectively, the act also includes a number of features that promote competitiveness. These features include independent action, loyalty contracts, service contracts, and shippers' associations.

The mandatory right of independent action is one of the key provisions of the Shipping Act of 1984. It specifies that conferences must allow members to offer a lower rate or different type of service than specified in the conference tariff. The FMC must receive at least 10 days' notice prior to enactment of the independent action, but conference approval is not required. Independent action rates or services must be made available to all shippers of that particular commodity.

Independent action can serve as a competitive "relief valve" for the conferences to respond to changing market conditions. Independent action can increase rate-making flexibility and vent competitive pressures
among conference members. Each conference member is allowed the latitude to act independently of conference-wide decisions. This may result in fewer carriers opting to leave conferences to pursue individual pricing strategies. This provision of the act has been widely used; over 45,000 independent actions were adopted between 1985 and 1988.

The act also created a new form of ocean freight contractual agreement called a service contract. A service contract is an agreement between a shipper and carrier in which the shipper commits a specified volume 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 with the FMC and made available for public inspection. These essential terms must be made available to any "similarly situated shipper" interested in obtaining a service contract for that commodity. Over 17,000 service contracts were filed with the FMC from 1984 to 1988, primarily by independent carriers.

The mandatory right of independent action does not extend to service contracts. Conferences may prohibit their members from entering into these arrangements, but cannot prevent independent (nonconference) carriers from entering into service contracts. A number of conferences have chosen to prohibit individual service contracts, contending that they undermine their ratemaking processes.

Shippers' associations also promote competition in the industry. The act allows shippers to band together and consolidate freight on a nonprofit basis to achieve volume rate discounts. Conferences are prohibited from refusing to negotiate with shippers' associations. There are presently about 40 active shippers' associations in the United States; very few deal exclusively in agricultural products.

The act is currently under review by a joint Presidential and Legislative Commission. The future status of conference antitrust immunity, mandatory tariff filing, and service contracts is being debated. The outcome of this review could have a considerable impact on ocean shipping, and the rates and services available to agricultural exporters.

In summary, the Shipping Act of 1984 directly influences the competitive environment in ocean liner shipping. Antitrust immunity effectively permits the restriction of competition among ocean carriers. The FMC and shippers have limited avenues to prevent the formation of conferences whose primary objective is to fix rates, set service levels, and control competition. However, the act also contains features designed to encourage rate and service competition among carriers. Independent action, loyalty contracts, service contracts, and shippers' associations were incorporated into the act to ensure that shippers could negotiate for the rates and services necessary to compete in the global marketplace.
Questions regarding the application of the Shipping Act of 1984, service contracts, tariffs, or potential violations of the act can be directed to the Federal Maritime Commission in Washington, DC (202) 523-5707, or the following FMC district offices:

New York ........................................ (212) 264-1425  
New Orleans ..................................... (504) 589-6662  
San Francisco ................................. (415) 744-7016  
Los Angeles ..................................... (213) 980-3423  
Miami ........................................... (305) 536-6963  
Houston ......................................... (713) 229-2841  
Hato Rey ......................................... (809) 766-5581

Agricultural shippers can also contact the USDA-AMS Transportation and Marketing Division at (202) 690-5304 regarding questions or problems with ocean liner shipping.

**Export Sales Reporting**

**Background**—In 1972, the Soviet Union purchased large amounts of grain from U.S. producers. These huge, unanticipated Soviet purchases of U.S. wheat and corn produced a sizeable increase in U.S. food prices and depleted U.S. reserve stocks. The Government was also concerned about the advantage large grain companies had at the time because they had more information than was available to the public on future prices and trends in grain trading.

In response, Congress mandated the reporting of export sales in 1973. The reporting system serves as an early warning system on the impact of agricultural export obligations on U.S. supplies and prices. The program also provides up-to-date export information to parties involved in the production and export of agricultural commodities. The data can be used to assess the level of export demand, to determine where markets exist, and to assess the relative position of different commodities in those markets.

**Reporting System**—Under Section 602 of the Agricultural Act of 1978, as amended, U.S. exporters are required to report all large sales of certain designated commodities to the USDA by 3 p.m. (Eastern time) on the next business day after the sale is made. Weekly reports (Friday - Thursday), are also required for all covered commodities, regardless of the size of the sales transaction. Reports include information on type, class, and quantity of the commodity; and the marketing year of shipment and destination, if known. Contract number, date, delivery period, terms, and name of foreign buyer are also reported on outstanding contracts on a rotational basis four times per year. Exporters also report any changes in previously reported information, such as cancellations and changes in destination. All reported information is confidential and released only in compilation form.
**Commodities To Be Reported**

- Wheat - by class *
- Wheat products
- Barley *
- Corn *
- Grain sorghum *
- Oats *
- Rye
- Soybeans *
- Soybean cake & meal *
- Soybean oil *
- Flaxseed
- Linseed Oil
- Cottonseed
- Cottonseed cake and meal
- Cottonseed oil
- Cotton - by type
- Rice - by class
- Cattle hides and skins (cattle, calf, and kip)

* Daily sales reporting requirement

Large sales for commodities, except soybean oil, are defined as 100,000 metric tons or more of one commodity in 1 day to a single destination, or 200,000 tons or more of one commodity during the weekly reporting period. Large sales for soybean oil are 20,000 tons and 40,000 tons, respectively.


**Dangerous Goods**

Dry ice transforms from a solid to gaseous carbon dioxide, displacing oxygen in enclosed spaces. When shipped by air, dry ice is considered a dangerous good and regulated by the U.S. Department of Transportation. 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.

**Weight Limits**--The airlines are forbidden to carry more than 440 pounds of dry ice per inaccessible cargo compartment.

**Packaging**--Packages that are used for dry ice must be designed to permit carbon dioxide gas escape without rupturing.

**Markings**--All international air shipments with packages containing dry ice must be marked with the following:
Perishable
(Product Shipped)

Dry Ice, UN 1845, Net Weight (in kilograms and pounds)

Note--The black-and-white hazard label is for Class 9 miscellaneous dangerous goods and must have the dimensions of 10 cm by 10 cm.

Air Waybill--All international shipments containing dry ice must include the following information on the air waybill:

- Proper shipping name (CARBON DIOXIDE or DRY ICE)
- Hazard class number ("9" for dry ice)
- UN identification number (UN1845 for dry ice)
- Number of packages containing dry ice
- Net quantity of dry ice per package
- UN packing group (III for dry ice)

Under "Handling Information" on the air waybill, write "Dangerous Goods-Shipper's Declaration Not Required." The entry for "Nature and Quantity of Goods" should read:

PRODUCT NAME,
DRY ICE 9 UN1845,
(NUMBER OF PACKAGES x WEIGHT OF DRY ICE IN EACH) III

Handling--Air carriers must follow Federal regulations for the handling of dry ice, such as notifying the pilot that the shipment will contain dry ice, separating dry ice shipments from compartments with live animals, and limiting shipments to the total amount of dry ice allowed by the Government. Due to these special handling requirements, shippers should make prior arrangements with airlines when shipping dry ice and deliver packages to the airlines 2 to 3 hours prior to departure.
Trade Assistance

There are a number of Federal and State agencies that offer technical assistance to exporters. This section lists selected agencies with export assistance programs related to agriculture and transportation. For further assistance, the Publications section (p. 171) includes directories that contain a more complete list of Federal and State agencies.

U.S. Department of Agriculture

The U.S. Department of Agriculture provides marketing assistance, foreign market information, export programs, and technical assistance for exporting agricultural products. To find any USDA telephone number not listed here, contact the USDA Locator Service (202) 720-USDA.

Agricultural Marketing Service

The Agricultural Marketing Service (AMS) of the USDA offers trade assistance to exporters through its Transportation and Marketing Division (TMD). TMD helps exporters by:

- Publishing books and tip sheets on shipping practices for exporters. (See Publications section p. 171.)
- Representing the interests of agricultural shippers before the Federal Maritime Commission and other regulatory agencies.
- Monitoring developments related to cargo preference, transportation subsidies, ocean container standards, the European Community, GATT, NAFTA, and other related issues.
- Conducting workshops and providing information and assistance to agricultural exporters on international transportation.

U.S. Department of Agriculture
International Transportation Branch, TMD, AMS
Room 1217, South Building
Washington, DC 20250
Phone: (202) 690-1304
FAX: (202) 690-1340

AMS food quality certification service facilitates exports by assuring foreign buyers that products shipped overseas meet contract specifications. Operated on a user fee basis, AMS works with firms to develop a written specification that can be certified. Contact the appropriate commodity branch for more details.
Agricultural Research Service

The Agricultural Research Service (ARS) provides exporters with information, research, and consultations on transportation, packaging, storage, refrigeration, plant and animal diseases and disorders, insect control, and pesticide residues. It also publishes studies on the best ways to select, pack, and ship for export.

International Activities
Agricultural Research Service
U.S. Department of Agriculture
Room 107, Building 005
BARC-West
Beltville, MD 20705
Phone: (301) 504-5605
FAX: (301) 504-5298
Animal and Plant Health Inspection Service

The Animal and Plant Health Inspection Service (APHIS) ensures that U.S. agricultural exports do not carry communicable diseases or insect pests. Animal and animal products are inspected to ensure compliance with health and sanitation requirements. Plants and unprocessed plant products can be inspected to ensure conformity with plant protection legislation of importing countries. After products pass inspection, APHIS issues inspection certificates. These certificates are required by some foreign countries to clear customs and are also required by some foreign buyers to ensure that products meet their quality standards.

In addition, APHIS offices provide U.S. exporters with information on import requirements of foreign nations for livestock and plants.
Animal and Plant Health Inspection Service
Veterinary Services
Room 764, Federal Building
6505 Belcrest Road
Hyattsville, MD 20782
Phone: (301) 436-8590
FAX: (301) 436-6402

Extension Service

The Extension Service (CES) offers educational programs designed to increase U.S. participation in global markets.

Extension Service
U.S. Department of Agriculture
Room 3340, South Building
Washington, DC 20250-0900
Phone: (202) 720-4341
FAX: (202) 720-4924

Cooperative State Research Service

The Cooperative State Research Service (CSRS) administers grants for International Trade Development Centers (ITDC’s). ITDC’s provide programs and services to farmers and agribusinesses to enhance exports of agricultural and forestry commodities and related products. Activities include developing and promoting programs unique to each region’s agricultural products, conducting research, providing market information, and offering conferences and seminars for exporters.

International Trade Development Centers:

Agricultural Trade Policy Center
University of Maryland
3205 Symons Hall
College Park, MD 20742
Phone: (301) 405-1301
FAX: (301) 314-9091
Appalachian Export Center for Hardwoods
West Virginia University
4000 Hampton Center, Suite B
P.O. Box 6061
Morgantown, WV 26506-6061
Phone: (304) 293-7577
FAX: (304) 293-7579

Center for Agricultural Export Development
University of Kentucky
Bradley Hall, Room 300
Lexington, KY 40506-0058
Phone: (606) 257-7267
FAX: (606) 258-1026

Center for International Trade Development
Oklahoma State University
204 CITD Hall of Fame and Washington Street
Stillwater, OK 74078-0390
Phone: (405) 744-7693
FAX: (405) 744-8973

Center for International Trade in Forest Products
University of Washington
College of Forest Resources
104 B Winkenwerder Hall, AR-10
Seattle, WA 98195
Phone: (206) 543-8684
FAX: (206) 543-3254

Idaho International Trade and Development Center
University of Idaho
College of Agriculture
Room 48
Moscow, ID 83843
Phone: (208) 885-6446
FAX: (208) 885-6654

International Agricultural Trade and Policy Center
Florida State University
Food and Resource Economics Department
P.O. Box 110240
Gainesville, FL 32611-0240
Phone: (904) 392-5063
FAX: (904) 392-3646
International Marketing Program for Agricultural Commodities and Trade
Washington State University
123 Hulbert Hall
Pullman, WA 99164-6214
Phone: (509) 335-6653
FAX: (509) 335-3598

International Trade Development Center
University of Georgia
International Trade Division
Small Business Development Center
Chicopee Complex
1180 East Broad Street
Athens, GA 30602
Phone: (706) 542-5760
FAX: (706) 542-6776

International Trade Institute
Kansas State University
2323 Anderson Avenue, Suite 110
Manhattan, KS 66502-2912
Phone: (913) 532-6799
FAX: (913) 532-5599

Mid-America World Trade Center
301 North Main, Suite 1860
Wichita, KS 67202
Phone: (316) 262-3232
FAX: (316) 262-3585

Midwest Agribusiness Trade Research And Information Center
Iowa State University of Science and Technology
Iowa State University
578 Heady Hall
Ames, IA 50011-1070
Phone: (515) 294-1183
FAX: (515) 294-6336

Northern Crops Institute
North Dakota State University
Box 5183, SU Station
Fargo, ND 58105
Phone: (701) 237-7736
FAX: (701) 237-7235
Western International Trade Development Center
Albers Mill Building
1200 NW. Front Avenue
Suite 230
Portland, OR 97209-2800
Phone: (503) 295-0823
FAX: (503) 295-2735

Economic Research Service

The Economic Research Service (ERS) is a major source of expertise, data, models, and research information about the agricultural economies and policies of foreign countries; the agricultural trade and development relationships between foreign countries and the United States; and U.S. agricultural policies.

Information Division
Economic Research Service
U.S. Department of Agriculture
1301 New York Avenue NW., Room 208
Washington, DC 20005-4788
Phone: (202) 219-0512
FAX: (202) 219-0112

Federal Grain Inspection Service

The Federal Grain Inspection Service (FGIS) inspects and certifies that grain produced in the United States meets the official U.S. standards for grain and contract specifications.

Federal Grain Inspection Service
U.S. Department of Agriculture
Room 1627, South Building
P.O. Box 96454
Washington, DC 20090-6454
Phone: (202) 720-0226
FAX: (202) 720-1015

Food Safety and Inspection Service

Export certification of meat and poultry products by the Food Safety and Inspection Service (FSIS) assures that the product, at the time of export certification, is sound, properly labeled, U.S. inspected and passed, and meets any requirements of the importing country.
Food Safety and Inspection Service
U.S. Department of Agriculture
Room 341-E, Administration Building
Washington, DC 20250
Phone: (202) 720-3474
FAX: (202) 690-3856

Export Coordination Division
Food Safety and Inspection Service
U.S. Department of Agriculture
Room 0019, South Building
Washington, DC 20250
Phone: (202) 720-9051
FAX: (202) 690-3856

Foreign Agricultural Service

The Foreign Agricultural Service (FAS) develops, expands, and maintains markets for U.S. agricultural products around the world.

Trade Assistance and Promotion Office--The Trade Assistance and Promotion Office serves as a single point of contact for agricultural exporters who need assistance, foreign market information, or who have been injured by unfair trade practices of foreign countries.

Trade Assistance and Promotion Office
USDA/FAS
Room 4939, South Building
Washington, DC 20250-1000
Phone: (202) 720-9509
FAX: (202) 690-4374

Office of Food Safety and Technical Services (OFSTS)--OFSTS responds to issues related to food safety problems and inquiries involving foreign product labeling, food standards, pesticide and additive regulations and other technical requirements for U.S. agricultural products.

Office of Food Safety and Technical Services
USDA/FAS/ITP
Room 5545, South Building
Washington, DC 20550-1000
Phone: (202) 720-1301
FAX: (202) 690-0677
Commodity and Marketing Programs--FAS Commodity and Marketing Programs conduct market development activities that cover more than 70 countries and virtually every U.S. agricultural product exported. Commodity marketing specialists support the work of cooperators and individuals interested in specific markets and products.

Commodity and Marketing Programs provide estimates for foreign agricultural production and analyze foreign production and trade reports. This commodity information is available to the public.

Dairy, Livestock, and Poultry Division
USDA/FAS
Room 6616, South Building
Washington, DC 20250-1000
Phone: (202) 720-8031
FAX: (202) 720-0617

Forest Products Division
USDA/FAS
Room 4647, South Building
Washington, DC 20250-1000
Phone: (202) 720-0638
FAX: (202) 720-8461

Grain and Feed Division
USDA/FAS
Room 5603, South Building
Washington, DC 20250-1000
Phone: (202) 720-6219
FAX: (202) 720-0340

AgExport Services Division
USDA/FAS/AESD
Room 4939, South Building
Washington, DC 20250-1000
Phone: (202) 690-3424
FAX: (202) 690-4374

Oilseeds and Products Division
USDA/FAS
Room 5646, South Building
Washington, DC 20250-1000
Phone: (202) 720-7037
FAX: (202) 720-0965
Export Programs—Under the Export Enhancement Program, USDA provides bonuses to U.S. exporters to help them meet world prices for targeted commodities and destinations.

Credit guarantee programs guarantee U.S. bank loans to foreign importers of certain U.S. agricultural products.

The National Agricultural Library (NAL) is the largest agricultural library in the world, with approximately 2.2 million volumes and subscriptions to 26,000 periodicals. The NAL is a repository for books, journals, maps, microforms, films, videocassettes, filmstrips, slides, and microcomputer software. It is the coordinator and primary resource for the national network of State land-grant universities and USDA field libraries working together to deliver information to those with an interest in agriculture and related topics. In addition, the NAL produces AGRICOLA, a computerized database indexing more than 2 million books and articles related to agriculture. (See the section on Databases for access information, p. 179.)

The NAL Agricultural Trade and Marketing Center focuses on agribusiness, countertrade (barter), exports, and trade development. It uses the worldwide resources of the NAL collection to organize and disseminate information. The Center’s staff can assist exporters to access NAL’s extensive collections on a broad range of trade and marketing subjects, refer exporters to organizations or experts in the field, identify
current research conducted by USDA agencies, furnish bibliographies on a variety of trade and marketing topics, perform brief searches of the AGRICOLA database, or assist exporters in their own AGRICOLA searches.

Agricultural Trade and Marketing Information Center
National Agricultural Library
U.S. Department of Agriculture
10301 Baltimore Boulevard, Room 304
Beltsville, MD 20705-2351
Phone: (301) 504-5509 or (301) 504-5414
FAX: (301) 504-5472

Export-Import Bank of the United States
The Export-Import Bank (Eximbank) of the United States provides assistance in financing exports of U.S. goods and services. The Eximbank helps U.S. exporters compete in overseas markets against subsidized financing by foreign governments. It offers four major export support programs: loans, loan guarantees, working capital guarantees, and insurance. The Eximbank also has an electronic bulletin board that can be accessed by modem. Information, news releases, and application forms are available. In addition, exporters can contact the Eximbank’s Business Advisory Hotline for help and information.

Export-Import Bank of the United States
Marketing Small Business Office
811 Vermont Avenue NW.
Washington, DC 20571
Phone: (202) 566-8873
FAX: (202) 566-7524
Bulletin Board: (202) 566-4699
Hotline: (800) 424-5201

Overseas Private Investment Corporation
The Overseas Private Investment Corp. assists U.S. private investment in investment in over 100 developing nations. It encourages investment projects that will help the social and economic development of these countries. At the same time, it helps the U.S. balance of payments through the profits returned to this country, as well as the U.S. jobs and exports created. OPIC offers U.S. investors assistance in finding investment opportunities, insurance to protect their investments, and loans and loan guarantees to help finance their projects.

Overseas Private Investment Corporation
1100 New York Avenue NW
Washington, DC 20527
Phone: (202) 336-8400
FAX: (202) 408-9859
The U.S. Small Business Administration (SBA) assists current and potential small business exporters through business development and financial assistance programs. These programs are provided through the SBA’s network of field offices around the country.

The SBA also serves as an 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
Financial Assistance, Office of Business Loans: (202) 205-6490
Small Business Innovation Research Program: (202) 205-6450
Office of Advocacy: (202) 205-6531
International Trade Assistance: (202) 205-6720

In addition, the SBA offers the following programs, which may be useful to agricultural exporters:

**SCORE (Service Corps of Retired Executives)**--Sponsored by the SBA, these locally chartered volunteer organizations provide problem-solving assistance to small businesses. SCORE tries to match counselor experience with client needs.

National SCORE Office
Phone: (202) 205-6200
Phone: (800) 827-5722

**Small Business Development Centers (SBDC)**--The centers are located in 49 States, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. There are over 600 service locations across the country. SBDCs offer "one-stop" assistance to small businesses, making a wide variety of information and guidance available on management techniques and technology. Most SBDCs are headquartered at universities or colleges, with approximately 600 subcenters located throughout the U.S. in easily accessible areas.

The U.S. Department of Commerce encourages, serves, and promotes the Nation’s international trade, economic growth, and technological advancement for agricultural machinery, equipment, fertilizer, veterinary supplies, and other noncommodity items.
Bureau of Export Administration

The Bureau of Export Administration controls export licensing and antiboycott compliance.

Bureau of Export Administration  
Department of Commerce  
Washington, DC 20233  
Export Licensing Room 1099  
Phone: (202) 482-4811  
Office of Antiboycott Compliance Room 3886  
Phone: (202) 482-2381

International Trade Administration

The International Trade Administration (ITA) promotes world trade and strengthens the international trade and investment positions of the U.S. The ITA coordinates all issues concerning import administration, international economic policy and programs, and trade development for nonagricultural trade operations.

Trade development activities include: managing trade fairs and exhibitions, trade missions, overseas trade seminars, and other promotional events; conducting conferences and seminars in the U.S.; assisting State and private-sector organizations on export financing; and promoting the export of fishing by working with the domestic fishing industry and the National Oceanic and Atmospheric Administration.

The Trade Information Center provides information on the multitude of Federal export assistance programs. The Center advises exporters on how to locate and utilize government programs and guide them through the export process.

Trade Information Center  
International Trade Administration  
U.S. Department of Commerce  
Room 7424  
14th and Constitution Avenue NW  
Washington, DC 20230  
Phone: (800) 872-8723  
FAX: (202) 482-4473

The Minority Business Development Agency--The Agency helps minority exporters in resolving management and technical questions, proposal writing, financial planning, capital acquisition, business and market plan development, market identification, trade missions, trade fairs, and training seminars.
Minority Business Development Agency
U.S. Department of Commerce
Room 5096
Washington, DC 20233
Phone: (202) 377-3237
FAX: (202) 377-5117

Federal Maritime Commission
The Federal Maritime Commission regulates ocean liner carriers, both American and foreign.

Bureau of Tariffs, Certification, and Licensing
Federal Maritime Commission (FMC)
800 North Capitol Street NW
Washington, DC 20573
Phone: (202) 523-5796
FAX: (202) 523-5830

Office of Freight Forwarders
FMC
800 North Capitol Street NW
Washington, DC 20573
Phone: (202) 523-5843
FAX: (202) 523-5830

U.S. Department of Transportation
The U.S. Department of Transportation (DOT) is responsible for ensuring the safety and reliability of all forms of transportation for protecting the interest of consumers, for conducting planning and research for the future, and in assisting cities and States to meet their local transportation goals.

Research and Special Programs Administration
DOT’s Research and Special Programs Administration manages a number of diverse and intermodal programs that include hazardous materials transportation and aviation data collection.

The Office of Hazardous Materials Transportation--This office is responsible for hazardous materials transportation safety regulation and enforcement. It develops and issues safety standards addressing every aspect of hazardous materials transportation for all types of transportation except marine bulk packaging. Each of the DOT modal administrations inspect and enforce the hazardous materials regulations applicable to their mode.

The Office of Aviation Information Management--This office collects and provides comprehensive air carrier financial and statistical data. Information collected includes international aviation and consumerism matters.
U.S. Department of the Treasury

Bureau of Alcohol, Tobacco, and Firearms

The Bureau of Alcohol, Tobacco, and Firearms regulates exportation of alcoholic beverages.

Alcohol Import/Export Branch
U.S. Department of the Treasury
Bureau of Alcohol, Tobacco, and Firearms
Room 5200
650 Massachusetts Avenue NW
Washington, DC 20226
Phone: (202) 927-8110
FAX: (202) 927-8605

Office of Foreign Assets Control

The Office of Foreign Assets Control provides exporters with up-to-date information on which destination countries require a validated export license or have trade embargoes against them.

Office of Foreign Assets Control
U.S. Department of the Treasury
1500 Pennsylvania Avenue NW
Washington, DC 20220
Phone: (202) 622-2500
FAX: (202) 622-1657

State Departments of Agriculture

ALABAMA
Department of Agriculture and Industries
Division of Marketing
P.O. Box 3336, Beard Building
Montgomery, AL 36109-0336
Phone: (205) 242-2571
FAX: (205) 240-3135
ALASKA
Department of Natural Resources
Division of Agriculture
P.O. Box 949
Palmer, AK 99645-0949
Phone: (907) 745-7200
FAX: (907) 745-7112

ARIZONA
Arizona State Department of Agriculture
Commodities Division
1688 West Adams
Phoenix, AZ  85007
Phone: (602) 542-4373
FAX: (602) 542-5420

ARKANSAS
Industrial Development Commission
Marketing Division
One State Capitol Mall
Little Rock, AR 72201
Phone: (501) 682-1121
FAX: (501) 682-7341
International Marketing
Phone: (501) 682-3571
FAX: (501) 682-7691

CALIFORNIA
Department of Food and Agriculture
Agricultural Export Program
1220 N Street, Room 108
Sacramento, CA 95814

- or -

Department of Food and Agriculture
Agricultural Export Program
P.O. Box 942871
Sacramento, CA  94271-0001
Phone: (916) 654-0389
FAX: (916) 653-2604
COLORADO
Department of Agriculture
Division of Markets
700 Kipling Street
Suite 4000
Lakewood, CO 80215-5894
Phone: (303) 239-4114
FAX: (303) 239-4125

CONNECTICUT
Department of Agriculture
Division of Markets
79 Elm Street
Hartford, CT 06106
Phone: (203) 566-4276
FAX: (203) 566-6094

DELAWARE
Department of Agriculture
Division of Promotion and Production Support
2320 South Dupont Highway
Dover, DE 19901
Phone: (302) 739-4811
FAX: (302) 697-6287

FLORIDA
Department of Agriculture and Consumer Services
Division of Marketing and Development
Mayo Building, Room 435
Tallahassee, FL 32399-0800
Phone: (904) 488-4031
FAX: (904) 922-2861

GEORGIA
Department of Agriculture
International Trade Division, Room 328
Agriculture Building, Capitol Square
Atlanta, GA 30334-2001
Phone: (404) 656-3740
FAX: (404) 656-9380

HAWAI\nDepartment of Agriculture
Marketing Services
1428 South King Street
Honolulu, HI 96814
Phone: (808) 973-9564
FAX: (808) 973-9590
IDAHO
Department of Agriculture
2270 Old Penitentiary Road
Boise, ID  83712
Phone: (208) 334-3521
FAX: (208) 334-2879

ILLINOIS
Department of Agriculture
Division of Marketing and Promotion
State Fairgrounds
Springfield, IL 62794-9281

- or -

Department of Agriculture
Division of Marketing and Promotion
P.O. Box 19281
Springfield, IL  62794-9281
Phone: (217) 782-6675
FAX: (217) 524-5960

INDIANA
Office of the Commissioner of Agriculture
Indiana Commission for Agriculture and Rural Development
150 West Market, Suite 414
Indianapolis, IN  46204
Phone: (317) 232-8770
FAX: (317) 232-1362

IOWA
Department of Agriculture
International Trade Bureau
Wallace State Office Building
Des Moines, IA 50319
Phone: (515) 242-6238
FAX: (515) 242-5015

KANSAS
State Board of Agriculture
Marketing Division
901 South Kansas Avenue, Room 103
Topeka, KS 66612-1282
Phone: (913) 296-3736
FAX: (913) 296-2247
KENTUCKY
Department of Agriculture
Marketing Development
Capitol Plaza Tower, Seventh Floor
500 Mero Street
Frankfort, KY 40601
Phone: (502) 564-4696
FAX: (502) 564-6527

LOUISIANA
Department of Agriculture and Forestry
International Marketing Division
P.O. Box 3334
Baton Rouge, LA 70821-3334
Phone: (504) 922-1280
FAX: (504) 922-1289

MAINE
Department of Agriculture
Marketing
State House Station 28
Augusta, ME 04333-0028
Phone: (207) 287-3491
FAX: (207) 287-7548

MARYLAND
Department of Agriculture
International Marketing
50 Harry S. Truman Parkway
Annapolis, MD 21401-7080
Phone: (301) 841-5770
FAX: (301) 841-5987

MASSACHUSETTS
Department of Food and Agriculture
Foreign Trade Marketing
100 Cambridge Street, 21st Floor, Room 2103
Boston, MA 02202
Phone: (617) 727-3000 ext. 101
FAX: (617) 727-7235
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) 471-3252

NEVADA
State Department of Agriculture
Executive Director
P.O. Box 11100
Reno, NV 89510
Phone: (702) 688-1180
FAX: (702) 688-1178

NEW HAMPSHIRE
Department of Agriculture
Bureau of Markets
P.O. Box 2042
Concord, NH 03302-2042

-or-

Bureau of Markets
10 Ferry Street
Concord, NH 03301
Phone: (603) 271-2505 or (603) 271-3685
FAX: (603) 271-1109

NEW JERSEY
Department of Agriculture
Division of Markets
CN 330
Trenton, NJ 08625
Phone: (609) 292-5536
FAX: (609) 984-2508

NEW MEXICO
Department of Agriculture
Marketing and Development Division
P.O. Box 30005, Department 5600
3190 South Espana - NMSU
Las Cruces, NM 88003-0005
Phone: (505) 646-4929
FAX: (505) 646-3303
NEW YORK
Department of Agriculture and Markets
Division of Agricultural Protection and Development Services
1 Winners Circle
Capitol Plaza
Albany, NY  12235-0001
Phone: (518) 457-7076
FAX: (518) 457-2716

NORTH CAROLINA
Department of Agriculture
Division of Marketing
P.O. Box 27647
Raleigh, NC 27611
-or-
Division of Marketing
2 West Edenton Street
Raleigh, NC 27601
Phone: (919) 733-7912
FAX: (919) 733-0999

NORTH DAKOTA
Department of Agriculture
Marketing
600 East Boulevard, Sixth Floor
State Capitol
Bismarck, ND 58505-0020
Phone: (701) 224-2231
FAX: (701) 224-4567

OHIO
Department of Agriculture
Division of Markets
65 South Front Street
Columbus, OH 43215-4193
Phone: (614) 466-6198
FAX: (614) 644-5017

OKLAHOMA
Department of Agriculture
International Marketing Section
2800 North Lincoln Boulevard
Oklahoma City, OK 73105-4298
Phone: (405) 521-3864
FAX: (405) 521-4912
OREGON
Department of Agriculture
635 Capitol Street, NE
Salem, OR 97310-0110
Phone: (503) 378-3773
FAX: (503) 378-5529

- or -

Agricultural Development & Marketing Division
121 Southwest Salmon Street
Suite 240
Portland, OR 97204-2987
Phone: (503) 229-6734
FAX: (503) 229-6113

PENNSYLVANIA
Department of Agriculture
Domestic and International Trade Division
2301 North Cameron Street, Room 310
Harrisburg, PA 17110-9408
Phone: (717) 783-3181
FAX: (717) 787-2387

PUERTO RICO
Department of Agriculture
Agricultural Services Administration Marketing Program
Box 9200
Santurce, PR 00908
Phone: (809) 722-5443
FAX: (809) 724-7940 or (809) 723-4197

RHODE ISLAND
Department of Environmental Management
Division of Agriculture
Roger Williams Building
22 Hayes Street
Providence, RI 02906-5025
Phone: (401) 277-2781
FAX: (401) 277-6047
SOUTH CAROLINA
Department of Agriculture
International Trade and Marketing Division
Wade Hampton State Office Bldg.
P.O. Box 11280
Columbia, SC 29211
Phone: (803) 734-2200
FAX: (803) 734-2192

SOUTH DAKOTA
Governor’s Office of Economic Development
Division of Export, Trade, and Marketing
711 East Wells Avenue
Pierre, SD 57501-3369
Phone: (605) 773-5735
FAX: (605) 773-3256

TENNESSEE
Department of Agriculture
Marketing Division
P.O. Box 40627, Melrose Station
Nashville, TN 37204
Phone: (615) 360-0160
FAX: (615) 360-0194

TEXAS
Department of Agriculture
International Marketing
P.O. Box 12847
Capitol Station
Austin, TX 78711
Phone: (512) 463-7435
FAX: (512) 463-1104

UTAH
Department of Agriculture
Marketing and Promotion
350 North Redwood Road
Salt Lake City, UT 84116-9957
Phone: (801) 538-7108
FAX: (801) 538-7126
VERMONT
Department of Agriculture
Agricultural Development
120 State Street
Montpelier, VT 05620-2901
Phone: (802) 828-2416
FAX: (802) 828-2361

VIRGIN ISLANDS
Department of Economic Development and Agriculture
P.O. Box 6400
St. Thomas, Virgin Islands 00804
Phone: (809) 774-8784
FAX: (809) 774-4390

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

WASHINGTON STATE
Department of Agriculture
Agricultural Development Division
P.O. Box 42560
Olympia, WA 98504-2570
Phone: (206) 753-5046
FAX: (206) 586-3470

WEST VIRGINIA
Department of Agriculture
Marketing and Development Division
State Capitol Building
Charleston, WV 25305
Phone: (304) 348-2210
FAX: (304) 348-2203
WISCONSIN
Department of Agriculture, Trade, and Consumer Protection
Marketing Division
801 West Badger Road
P.O.Box 8911
Madison, WI 53708-8911
Phone: (608) 266-1531
International Agribusiness Center
Phone: (608) 266-2221
FAX: (608) 266-1300

WYOMING
Department of Agriculture
Marketing Division
2219 Carey Avenue
Cheyenne, WY 82002-0100
Phone: (307) 777-6577
FAX: (307) 777-6593

State
Government
Trade Offices

ALABAMA
Alabama Development Office
Office of International Trade
401 Adams Avenue
Montgomery AL 36130
Phone: (205) 242-0400
FAX: (205) 242-0486

ALASKA
Department of Commerce and Economic Development
P.O. Box 110800
Juneau, AK 99811-0800
Phone: (907) 465-2500
FAX: (907) 463-3841

ARIZONA
Director of International Trade
Arizona Department of Commerce
3800 North Central Avenue, Suite 1500
Phoenix, AZ 85012
Phone: (602) 280-1371
FAX: (602) 280-1305
ARKANSAS
International Marketing
Arkansas Industrial Development Commission
1 State Capitol Mall
Little Rock, AR 72201
Phone: (501) 682-1121
FAX: (501) 682-7691

CALIFORNIA
California State World Trade Commission
1121 L Street, Suite 310
Sacramento, CA 95814
Phone: (916) 324-5511
FAX: (916) 324-5791

COLORADO
International Trade Office
1625 Broadway, Suite 680
Denver, CO 80202
Phone: (303) 892-3850
FAX: (303) 892-3820

CONNECTICUT
International Division
Department of Economic Development
865 Brook Street
Rocky Hill, CT 06067-3405
Phone: (203) 258-4256
FAX: (203) 529-0535

DELAWARE
Delaware Development Office
99 Kings Highway
P.O. Box 1401
Dover, DE 19903
Phone: (302) 739-4271
FAX: (302) 739-5749

FLORIDA
Division of International Trade and Development
Department of Commerce
Collins Building
107 West Gaines, Room 366
Tallahassee, FL 32399-2000
Phone: (904) 488-6124
FAX: (904) 487-1407
GEORGIA
Department of Industry, Trade and Tourism
P.O. Box 1776
Atlanta, GA 30301
Phone: (404) 656-3581
FAX: (404) 656-3567

HAWAII
Department of Business, Economic Development, and Tourism
Business Attraction Branch
P.O. Box 2359
Honolulu, HI 96804
Phone: (808) 587-2750
FAX: (808) 587-2787

IDAHO
Department of Commerce
700 West State Street
State House Mail
Boise, ID 83720-2700
Phone: (208) 334-2470
FAX: (208) 334-2631

INDIANA
Department of Commerce
International Trade Division
One North Capitol Avenue, Suite 700
Indianapolis, IN 46204-2288
Phone: (317) 232-8845 or 232-3527
FAX: (317) 232-4146

IOWA
International Trade
Department of Economic Development
200 East Grand Avenue
Des Moines, IA 50309-1819
Phone: (515) 242-4700
FAX: (515) 242-4749

KANSAS
Kansas Department of Commerce
700 SW Harrison, Suite 1300
Topeka, KS 66603-3957
Phone: (913) 296-3483
FAX: (913) 296-5055
LOUISIANA
Louisiana Department of Economic Development
P.O. Box 94185
Baton Rouge, LA 70804-9185
Phone: (504) 342-5361
FAX: (504) 342-5389

MAINE
Department of Economic and Community Development
State House, Station 59
Augusta, ME 04333
Phone: (207) 287-2656
FAX: (207) 287-2861

MARYLAND
Housing Department and Community Development
100 Community Place
Crownsville, MD 21032
Phone: (301) 514-7000
FAX: (301) 987-4070

MASSACHUSETTS
Massachusetts Office of Business Development
1 Ashburton Place, 21st Floor
Boston, MA 02108
Phone: (617) 727-3206
FAX: (617) 727-8797

MICHIGAN
Marketing & Market Development Division
Michigan Department of Agriculture
P.O. Box 30017
Lansing, MI 48909
Phone: (517) 373-1058
FAX: (517) 335-0628

MISSISSIPPI
Department of Economic and Community Development
P.O. Box 849
Jackson, MS 39205
Phone: (601) 359-3448 or (601) 359-3797
FAX: (601) 359-2832 or (601) 359-3605
MISSOURI
International Business Development
Department of Economic Development
Harry S. Truman Building
301 West High Street, Room 770
Jefferson City, MO 65101

-or-

P.O. Box 118
Jefferson City, MO 65102
Phone: (314) 751-4241
FAX: (314) 751-7385

MONTANA
Department of Commerce
1424 Ninth Avenue
Helena, MT 59620
Phone: (406) 444-3923
FAX: (406) 444-2903

NEBRASKA
International Division
Department of Economic Development
P.O. Box 94666
301 Centennial Mall South
Lincoln, NE 68509-4666
Phone: (402) 471-3111 or 1-800-426-6505
FAX: (402) 471-3778

NEVADA
Department of Economic Development
Capitol Complex
Carson City, NV 89710
Phone: (702) 687-4325
FAX: (702) 687-4450

NEW HAMPSHIRE
Department of Resources and Economic Development
Office of Business & Industrial Development
International Trade, P.O. Box 856
Concord, NH 03302-0856
Phone: (603) 271-2591
FAX: (603) 271-2629
NEW JERSEY
Department of Commerce and Economic Development
Division of International Trade
153 Halsey Street, Fifth Floor
Newark, NJ  07101
Phone: (201) 648-3518
FAX: (201) 623-1287

NEW MEXICO
Economic Development Department
Trade Division
Montoya Building
1100 St. Francis Drive
Santa Fe, NM 87503
Phone: (505) 827-0380
FAX: (505) 827-0407

NEW YORK
Department of Economic Development
1515 Broadway, 51st Floor
New York, NY  10036
Phone: (212) 827-6100
FAX: (212) 827-6279

NORTH CAROLINA
Department of Commerce
International Trade Division
430 North Salisbury Street
Raleigh, NC 27611
Phone: (919) 733-7193
FAX: (919) 733-0110

NORTH DAKOTA
North Dakota World Trade, Inc.
1833 East Bismarck Expressway
Bismarck, ND 58504
Phone: (701) 221-5336
FAX: (701) 221-5320

OHIO
Ohio Department of Development
International Trade Division
P.O. Box 1001
Columbus, OH 43266-0101
Phone: (614) 466-5017
FAX: (614) 463-1540
OKLAHOMA
Oklahoma Department of Commerce
International Trade and Investment
6601 Broadway Extension
Oklahoma City, OK 73116

-or-

P.O. Box 26980
Oklahoma City, OK 73126-0980
Phone: (405) 841-5217
FAX: (405) 841-5245

OREGON
Department of Economic Development
International Trade Division
One World Trade Center
121 SW Salmon, Suite 300
Portland, OR 97204
Phone: (503) 229-5625 or
(800) 448-7512 (in Oregon only)
FAX: (503) 222-5050

- or -

Oregon Economic Development Office
775 Summer Street NE
Salem, OR 97310
Phone: (503) 373-1200
FAX: (503) 581-5115

PENNSYLVANIA
Department of Commerce
Office of International Trade
464 Forum Building
Harrisburg, PA 17120
Phone: (717) 787-7190
FAX: (717) 234-4560

RHODE ISLAND
Department of Economic Development
7 Jackson Walkway
Providence, RI 02903
Phone: (401) 277-2601
FAX: (401) 277-2102
SOUTH CAROLINA
State Development Board
International Division
P.O. Box 927
Columbia, SC 29202
Phone: (803) 737-0400
FAX: (803) 737-0818

SOUTH DAKOTA
Governor’s Office of Economic Development
711 East Wells Avenue
Pierre, SD 57501-3369
Phone: (605) 773-5032
FAX: (605) 773-3256

TENNESSEE
Department of Economic and Community Development
Tennessee Export Office
Rachel Jackson Building
320 Sixth Avenue North
Nashville, TN 37243-0405
Phone: (615) 741-5870
FAX: (615) 741-5829

TEXAS
Department of Commerce
International Trade Division
P.O. Box 12728, Capitol Station
Austin, TX 78711
Phone: (512) 472-5059
FAX: (512) 320-9674

UTAH
Division of Community and Economic Development
324 South State Street, Suite 500
Salt Lake City, UT 84114
Phone: (801) 538-8700
FAX: (801) 538-8888

VERMONT
Department of Economic Development
109 State Street
Montpelier, VT 05609
Phone: (802) 828-3221
FAX: (802) 828-3258
VIRGINIA
Department of Economic Development
P.O. Box 798
Richmond, VA 23206-0798
Phone: (804) 786-3791
FAX: (804) 371-8112

WASHINGTON STATE
Department of Trade and Economic Development
Market and Targeted Industry Development Group
2001 Sixth Avenue, Suite 2600
Seattle, WA 98121
Phone: (206) 464-7143
FAX: (206) 464-7222

- or -

Department of Trade and Economic Development
Business Development Division
2001 Sixth Avenue, Suite 2700
Seattle, WA 98121
Phone: (206) 464-6282
FAX: (206) 464-5868

WEST VIRGINIA
Development Office
State Capitol, Room M-146
Charleston, WV 25305
Phone: (304) 558-0400
FAX: (304) 558-0362

WISCONSIN
Department of Development
P.O. Box 7970
123 West Washington Avenue
Madison, WI 53707
Phone: (608) 266-1018
FAX: (608) 267-2829

WYOMING
Department of Commerce
International Trade Office
The Barrett Building, Fourth Floor
N-2301 Central Avenue
Cheyenne, WY 82002
Phone: (307) 777-6412
FAX: (307) 777-5840
- or -

Wyoming Department of Commerce
Division of Economic and Community Development
The Barrett Building, Fourth Floor
N-2301 Central Avenue
Cheyenne, WY 82002
Phone: (307) 777-7285
FAX: (307) 777-5840
Publications

Exporters can garner valuable information on export transportation, marketing strategies, financing, and other export-related issues from myriad publications. This section lists a few of the publications available to exporters.

Publications by the International Transportation Branch of USDA's Agricultural Marketing Service are available free of charge. For price information on other listed publications, or to order, contact the publisher directly. Contact information for publishers is listed with the publication or for publishers with multiple publications listed on page 175 of this section.

Publications


Air Cargo From A to Z--Air Transport Association of America.


Code of Federal Regulation Title 49, "Transportation parts 100 through 199"--Government Printing Office.


Food and Agricultural Export Directory 1990--U.S. Department of Agriculture, Foreign Agricultural Service, Export Programs Division, Washington, DC 20250. (Report No.: Miscellaneous 1481.)


Guidelines For the Air Shipment of Seafood--(English or Spanish) Air Transport Association of America.


OAG Air Cargo Guide--OAG Air Cargo Guide, 2000 Clearwater Drive, Oak Brook, IL 60521. Phone: (800) 342-5624

The Ocean Liner Antitrust Exemption: Economic and Agricultural Impacts--USDA, International Transportation Branch. 1991

Postharvest Resources Directory--University Extension and Department of Pomology, University of California, Davis, CA 95616. 1992.

Postharvest Technology of Horticultural Crops--University of California, Division of Agriculture and Natural Resources. Publication 3311. 1992.


Specialty and Minor Crops Handbook--The Small Farm Center, University of California, Division of Agriculture and Natural Resources. Publication 3346. 1991.


Journals

Ag Exporter—Monthly magazine. U.S. Department of Agriculture, Foreign Agricultural Service. Contains information on overseas markets, buying trends, trade policy developments, country briefs, marketing news, overseas promotional activities, and export services. (NAL Call No.: AHD1401.A7)


Cargill Bulletin—Monthly publication. Cargill, Inc., Minneapolis, MN. Provides information on domestic and international market conditions and public policy questions involving agriculture and world trade.

Country Reports—Quarterly publication. Business International, 40 Duke Street, London W1M 1DW, England. Ninety-two editions provides business-oriented analysis of current political and economic development in 165 countries. For every country covered, the service comprises four quarterly country reports and an annual country profile. (NAL Call No.: varies with each country)


Farmer Cooperatives—Monthly publication. U.S. Department of Agriculture, Agricultural Cooperative Service, Washington, DC. Contains information on exports and international trade. (NAL Call No.: 166.2 N47)

Fruit and Vegetable Markets—Monthly publication. Agra Europe (London), Ltd, 25 Frant Road, Tunbridge Wells, Kent TN2 5JT, England. Provides information on fresh and processed fruit and vegetables; market and trade news; legislation, and the latest price production and trade statistics.


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 the USDA). Also includes "Shipcards," a listing of steamship companies, their routes, departure dates, and estimated arrival dates.


Publishers

Air Transport Association of America
1709 New York Avenue NW
Washington, DC 20006-5206
Phone: (202) 626-4000

Braddock Communications, Inc.
Alexandria, VA 22314-1555
Phone: (703) 549-6500

ICC Publishing Corp.
156 Fifth Avenue, Suite 820
New York, NY 10010
Phone: (212) 206-1150

U.S. Department of Agriculture
Foreign Agricultural Service
Information Division
Room 5920, South Building
Washington, DC 20250-1000
Phone: (202) 720-7937
FAX: (202) 720-3229

U.S. Department of Agriculture
International Transportation Branch, TMD
Agricultural Marketing Service
Publications
Room 1217, South Building
Washington, DC 20250
Phone: (202) 690-5304
FAX: (202) 690-1340
The following companies publish air cargo tariffs:

Air Tariff Publishing Co.
Dulles International Airport
P.O. Box 17415
Washington, DC 20041
Phone: (703) 471-7510

The Air Cargo Tariff
P.O. Box 903
2130 EA Hoofddorp
The Netherlands
Phone: 31-2503-73520
FAX: 31-2503-73516

The Air Cargo Tariff
Pan Am Cargo Dept.
Building 67, Room 2187
JFK International Airport
Jamaica, NY 11430
Phone: (718) 632-4780
FAX: (718) 632-4746

Cargo Rate Services, Inc., Agent
7270 NW 12th Street, Suite 580
Miami, FL 33126
Phone: (305) 591-9475
Air Transport Association (ata) of America
1709 New York Avenue NW
Washington, DC 20006-5206
Phone: (202) 626-4000
Phone: (212) 963-8302
Databases

These databases provide information on agribusiness, exports, imports, markets and trade. Possible sources for online database search services in the U.S. are: State/region networks, major public libraries, land-grant university libraries, and large research libraries. Outside the U.S., check with major universities and National or provincial institution libraries.

For further information regarding these databases and services available, please contact the online service provider. Addresses for online service providers are listed at the end of this section.

• AGRA EUROPE ONLINE - 1986 to date
  Producer: Agra Europe (London) Ltd.
  Coverage: Covers the agricultural industry, including all aspects of European and world trade in food and agricultural commodities. Covers the Common Agricultural Policy of the European Community (EC), market reports, prices and trends, and international news, including coverage of eastern Europe, the former Soviet Union, and China.
  Online Service: Agra Europe (London) Ltd.

• AGRIBUSINESS U.S.A - 1985 to July 1990
  Producer: Pioneer Hi-Bred International, Inc., Johnston, IA
  Coverage: Database covers all facets of agribusiness. It is designed to track U.S. and regional agribusiness information.
  Online Service: DIALOG (File 581)

• AGRICOLA - 1970 to date
  Producer: USDA, National Agricultural Library, Beltsville, MD
  Coverage: Provides comprehensive coverage of worldwide journal literature and monographs on agriculture and related topics and on food science and nutrition.
  Online Service: BRS; DIALOG (File 110 - 1970-1978, File 10 - 1979 to date); CD ROM/Silver Platter; Knowledge Index; DIMDI

• AGRICULTURAL COMPUTING AGLINE - June 1983 - present
  Producer: Doane Information Services
Coverage: Covers commodity prices, new product announcements, advice on marketing crops and livestock, and software reviews. Public domain software may be downloaded.

Online Service: Doane Information Services  (Subscription to AGRICULTURAL COMPUTING required.)

- **AGRIDATA NETWORK**  
  Producer: AgriData Resources, Inc. and others

  Coverage: Agricultural business and community news (includes U.S. and international news of events that can affect agricultural commodities markets).

  Online Service: AgriData Network

- **AGRIS INTERNATIONAL (International Information System for the Agricultural Science and Technology) - 1975 to date**  
  Producer: USDA, National Agricultural Library, Beltsville, MD

  Coverage: Focuses on many agricultural topics, including economics, development, administration and legislation, rural sociology, etc. It corresponds in part to Agrlndex, a monthly publication of the Food and Agriculture Organization of the United Nations.

  Online Service: DIALOG (File 203; only non-U.S. documents); CD ROM/Silver Platter; DIMDI; ESA-IRS (File 29); International Atomic Energy Agency (IAEA)

- **AGTRADE - 1986 to date**  
  Producer: USDA, Special Programs Division, Washington, DC

  Coverage: Offers a wide variety of information on international agricultural trade. AgTrade can be accessed by modem on personal computers and on communicating word processors. Users must obtain an account with USDA’s contractor.

  Online Service: USDA ONLINE

- **AMERICAN BANKER - November 1981 to date**  
  Producer: American Banker-Bond Buyer, New York, NY

  Coverage: Local, regional, and international financial services; international trade; government regulations; and general economic overviews.

  Online Service: DIALOG (File 625)
• ANTITRUST & TRADE REGULATION REPORT - 1982 to date  
  Producer: The Bureau of National Affairs, Inc. (BNA)  
  Coverage: Contains U.S. legislative, regulatory, and judicial activities  
  related to laws on restrictive trade practices. Coverage is primarily  
  U.S., with some international coverage.  
  Online Service: Mead Data Central, Inc. (TRADRG); West Publishing  
  Co. (BNA-ATRR). (Subscription required)  

• ARAB INFORMATION BANK - January 1983 to date  
  Producer: Al Bayan Press, Printing and Publishing Est., Dubai UAE  
  Coverage: Provides information on all aspects of Middle East  
  business, economics, social life, and politics.  
  Online Service: DIALOG (File 465); Al Bayan Press  

• ASIAN ECONOMIC NEWS - May 29, 1989 to date  
  Producers: Kyodo News International, Inc., and Predicasts  
  Coverage: Contains economic news in the Far East, excluding  
  Japan. Also covers country reports, policy on inter-Asia trade, and  
  debts and loans. Subscription to NewsNet required.  
  Online Service: Data-Star (PTBN); DIALOG (File 636); NewsNet, Inc.  

• ASIA-PACIFIC - 1985 to date  
  Producer: Aristarchus Knowledge Industries, Tucson, AZ  
  Coverage: Covers business, economics, and new industries of the  
  Pacific Rim countries.  
  Online Service: DIALOG (File 30)  

• AUSTRALIAN BIBLIOGRAPHY OF AGRICULTURE - 1975 to date  
  Producer: Commonwealth Scientific Industrial Research Organization  
  (CSIRO)  
  Coverage: Australian agriculture. Topics include fisheries; forestry;  
  food technology; human nutrition; soil, plant, and animal sciences;  
  agricultural economics; and rural sociology.  
  Online Service: CSIRO AUSTRALIS  

• AUSTRALIAN BUREAU OF AGRICULTURAL AND RESOURCE  
  ECONOMICS - 1946 to date  
  Producer: Australian Bureau of Agricultural and Resource Economics
Coverage: Quarterly and annual time series on Australian agriculture.

Online Service: I.P. Sharp Associates (A Reuter Co.)

- AUTOMATED TRADE LIBRARY SERVICE (ATLS) - Current information
  Producer: California State World Trade Commission's Office of Export Development and the California Agricultural Technology Institute (CATI)

  Coverage: Offers California exporters access to a network containing market research, trade leads, and other valuable information.

  Online Service: ATI-Net (Advanced Technology Information Network)

- BDI - Current information
  Producer: Industriedatenbank Sachon Verlag, GambH & Co., West Germany

  Coverage: Business, industry, and manufacturers in the Federal Republic of Germany and West Berlin that are involved in export trade.

  Online Service: Data-Star (BDI English only); FIZ Technik (BDI both in English and German); GENIOS Wirtschaftsdatenbanken.

- BISNES ONLINE (BUSINESS INFORMATION BELGIUM) - Current information
  Producer: Infotrade, Belgium

  Coverage: Belgian business and industry. (Languages: Dutch, English, and French)

  Online Service: INFOTRADE (annual subscription required); also available on diskette and magnetic tape

- BNA INTERNATIONAL TRADE DAILY - September 1987 to date
  Producer: The Bureau of National Affairs, Inc. (BNA)

  Coverage: Covers federal judicial, legislative, and regulatory activities affecting U.S. trade, including import limitations and licensing.

  Online Service: DIALOG (File 655); Executive Telecom System, Inc. (ETSI/HRIN); Mead Data Central, Inc.; and West Publishing Co. (BNA-BTD). (Subscription to ETSI/HRIN, Mead Data Central, or West Publishing Co. required.)
• CAB ABSTRACTS - 1972 to date
  Producer: Commonwealth of Agriculture Bureau International, Farnham Royal, Slough, England

  Coverage: Variety of agricultural topics including agricultural economics. It is a major index of literature dealing with the science of agriculture.

  Online Service: BRS; DIALOG (File 53 - 1972 to 83, File 50 - 1984 to date); CD ROM/Silver Platter; Data-Star; CISTI; DIMDI; ESA-IRS; Knowledge Index

• CANADA-U.S. FREE TRADE AGREEMENT - Current information
  Producer: Southam Business Information and Communications Group, and QL Systems, Ltd.

  Coverage: Full text of the 1987 Canada-U.S. Free Trade Agreement, including notes and tariff schedules.

  Online Service: Infomart Online (Subscription fee required); QL Systems, Ltd. (FTA)

• CANADIAN BUSINESS AND CURRENT AFFAIRS - July 1980 to date
  Producer: Micromedia Ltd., Toronto, Ontario, Canada

  Coverage: Business. Provides a wide range of company products and industry information.

  Online Service: DIALOG (File 262)

• CARISPLAN (Caribbean Information System for Economic and Social Planning) - 1980 to date
  Producer: Economic Commission for Latin America and the Caribbean, Subregional Headquarters for the Caribbean

  Coverage: Economic and social development. (Languages: original language of source document with keywords in English, French, and Spanish.)

  Online Service: Economic Commission for Latin America and the Caribbean (ECLAC), Subregional Headquarters for the Caribbean (membership required)

• CELEX - March 1957 to date
  Producer: Commission of the European Communities (CEC), Belgium
Coverage: Covers legal and regulatory information on the European Economic Community. (Languages: Danish, Dutch, English, French, German, and Italian)

Online Service: CEC; Datalex, S.A.; PROFILE Information; EDICLINE; Eurobases Juridial

- CITEX - 1977 to date
  Producer: European Organization of Textile and Clothing Manufacturers (CITH)

  Coverage: Contains trade data for the textile and clothing industries.

  Online Service: SIRIO

- COFFEELINE - 1973 to date

  Coverage: Covers worldwide literature on all aspects of the production, trade, and consumption of coffee. (Languages: English, French, Portuguese, and Spanish.)

  Online Service: DIALOG (File 164)

- COMMERCE BUSINESS DAILY (CBD Online) - October 1982 to date
  Producer: U.S. Department of Commerce, Chicago, IL

  Coverage: Contains information on products and services wanted or offered by the U.S. government, Federal procurement information, U.S. government standards which may affect U.S. exports.

  Online Service: DIALOG (Files 194, 195); Aviation/Aerospace Online; McGraw-Hill (DRI); Export Network Ltd.; Information Plus

- CRIS/USDA - (Current Research Information System) - Current information
  Producer: U.S. Department of Agriculture/Cooperative State Research Service, Beltsville, MD

  Coverage: Covers current research in agriculture and related sciences, sponsored or conducted by USDA research agencies, state agricultural experiment stations, state forestry schools, and other cooperating state institutions. Other subject areas include marketing and economics.

  Online Service: DIALOG (File 60)
• D&B EUROPEAN DUN'S MARKET IDENTIFIERS - Current information  
  Producer: Dun's Marketing Services, Parsippany, NJ  
  Coverage: Contains detailed information on over 1.5 million businesses located in 36 European countries.  
  Online Service: DIALOG (File 521)

• D&B INTERNATIONAL DUN'S MARKET IDENTIFIERS - Current information  
  Producer: Dun's Marketing Services, Parsippany, NJ  
  Coverage: Contains directory listings, sales volume and marketing data, and references to parent companies for over 500,000 non-U.S. companies.  
  Online Service: DIALOG (File 518)

• DELPHES EUROPEAN BUSINESS - Current information  
  Producer: Paris Chamber of Commerce and Industry, Paris, France  
  Coverage: Covers international markets, products, industries and companies, agriculture, food and beverages, transportation, international trade, joint ventures, Europe, Eastern Europe, Africa, and wines & spirits.  
  Online Service: DIALOG (File 481)

• DRI FREIGHT TRANSPORTATION FORECAST - 3-month to 10-year forecasts  
  Producer: McGraw-Hill (DRI)  
  Coverage: Contains monthly, quarterly, and annual forecasts for U.S. surface freight transportation.  
  Online Service: McGraw-Hill (DRI) (subscription required); Information Plus

• DRI/TBS WORLD SEA TRADE FORECAST - Annual series, 1981 to date; quarterly series, 1985 to date; 5-year forecasts  
  Coverage: Covers major trading routes such as: U.S. Southern Pacific Coast to Japan, 40 commodity categories, vessel types, and data by metric tonnage.  
  Online Service: McGraw-Hill (DRI)
• EAST ASIA EXPRESS
   Producer: International Industrial Information, Ltd.; Predicasts

   Coverage: A newsletter containing business news on East Asian countries and their foreign trading partners; includes reports of contracts awarded to foreign companies.

   Online Service: Data-Star (PTBN); DIALOG (File 636); Export Network, Ltd. (subscription required); NewsNet, Inc. (subscription required)

• EAST ASIAN BUSINESS INTELLIGENCE - November 1986 to date
   Producer: International Executive Reports, Ltd.

   Coverage: Covers business opportunities and developments in East Asia, contact name, company address, and contact numbers.

   Online Service: NewsNet, Inc. (monthly subscription required)

• EAST EUROPEAN MARKETS - September 1986 to date
   Producer: Financial Times Electronic Publishing

   Coverage: Covers political, commercial, economic, and legal developments in eastern Europe, and the effects of political changes on international business opportunities.

   Online Service: Data-Star; Mead Data Central, Inc. (EEM) (subscription required); PROFILE Information (subscription required)

• EC 1992 DATABASE - Current information
   Producer: Deloitte Haskins & Sells

   Coverage: Contains full text and summaries of reports prepared by Deloitte Haskins & Sells on European Community (EC) policy and legislation relating to the removal of non-tariff trade barriers within the EC in 1992. Includes studies of various industry sectors, such as agriculture, food, information technology, and transportation.

   Online Service: Infotrade (subscription required); INVESTEXT/PLUS; PROFILE Information (subscription required)

• ECONLINE - Dates vary, beginning from mid-1960
   Producer: Reuters Limited

   Coverage: Covers international economics, finance, and trade.

   Online Service: Reuters Limited
• ECONOMIC LITERATURE INDEX - Journals: 1969 to date; collected works: 1979 to date
  Producer: American Economic Association, Pittsburgh, PA
  Coverage: Covers journal articles and book reviews from 260 economics journals and 200 monographs. The database corresponds to the index section of the Quarterly Journal of Economic Literature and the annual index of Economic Articles.
  Online Service: DIALOG (File 139); CD ROM/Silver Platter

• ECONOMIC RESEARCH SERVICE (ERS) - Dates vary
  Coverage: ERS collects data on factors affecting agriculture, conducts research in domestic and foreign agricultural economics, evaluates marketing potentials and development, marketing costs, and U.S. trade in agricultural products.
  Online Service: USDA Economic Research Service

• EMPRESAS - Current information
  Producer: Instituto de la Pequena y Mediana Empresa Industrial, Madrid, Spain (IMPI)
  Coverage: Directory on Spanish business and industry, contains descriptions of several thousand Spanish business firms in Spanish language.
  Online Service: IMPI

• ENCYCLOPEDIA OF ASSOCIATIONS - Current edition
  Producer: Gale Research, Inc., Detroit, MI
  Coverage: Provides detailed information on several thousand trade associations, professional societies, labor unions, and other groups and organizations, including the scope and purpose of the organization, list of publications, location, and date of conferences.
  Online Service: DIALOG (File 114); CD ROM/Silver Platter; also available on diskette and magnetic tape

• EUROMONEY TRADE FINANCE REPORT - July 1985 to date
Coverage: Contains news, data, and commentary on imports, exports, and project financing. Covers export credits, as well as news on counter trade and forfeit finance.

Online Service: Euromoney Online (subscription required)

- EUROPEAN DIRECTORY OF AGROCHEMICAL PRODUCTS - Current information
  Producer: Royal Society of Chemistry

Coverage: Contains comprehensive data and information on agrochemical products manufactured, marketed, or used in Eastern or Western Europe.

Online Service: Data-Star (EDAP); DIALOG (File 316)

- EXPORT AGRO STAT - Current 5 years
  Producer: Centre Francais du Commerce Exterieur, Direction des Produits Agro-alimentaires

Coverage: Contains monthly and annual time series on agricultural export products from the European Community and its primary trading partners.

Online Service: Statistica

- EXPORT CONTROL NEWS - 1988 to date
  Producer: MK Technology Associates, Ltd.; supplied by Predicasts

Coverage: Contains full text of EXPORT CONTROL NEWS, a monthly newsletter covering the field of U.S. export control. Includes analyses of government policy shifts and regulation changes that could affect marketing and sales opportunities for the U.S. exporter. Contains policy reports on individual countries and summaries of significant legislative activity.

Online Service: Data-Star (PTBN); DIALOG (File 636)

- EXPORT NETWORK - COUNTRY & MARKET RESEARCH - Time span of coverage varies
  Producer: Export Network Ltd., with information supplied by the British Standards Institution; Export Intelligence Service, Department of Trade and Industry/British Overseas Trade Board; ICC Information Group, Ltd; Tate Telex and Continuous Stationery Ltd.; and others.
Coverage: Covers international trade import and export documentation, shipment inspection, import licensing, and other trade regulations; a list of trade exhibitions sponsored by the British Overseas Trade Board; and contact information.

Online Service: Export Network Ltd. (subscription required)

- **EXPORT NETWORK - EC 1992 - Current information**

  Coverage: Covers trade and regulations of the European Community. Includes a list of Export Houses Association members who can provide U.K. companies with assistance and expertise on overseas trade.

  Online Service: Export Network, Ltd. (subscription required)

- **EXPORT NETWORK - FINANCE - Current information**
  Producer: Export Network Ltd., with information supplied by others.

  Coverage: Contains financial information for U.K. and international exporters.

  Online Service: Export Network Ltd. (subscription required)

- **EXPORT NETWORK - TRANSPORT & TRAVEL - Current information**
  Producer: Export Network Ltd., with information supplied by the Institute of Freight Forwarders, Ltd., Tate Telex and Continuous Stationery Ltd., Thomas Cook, and others.

  Coverage: Contains information on freight transportation and travel; names, addresses, and specialties of U.K.-based freight forwarding companies, and information on changes in trade regulations for 150 countries.

  Online Service: Export Network Ltd. (subscription required)

- **THE EXPORTER - May 1983 to date**
  Producer: Trade Data Reports, Inc.

  Coverage: Contains various aspects of exporting from the U.S., such as markets, tariff and non-tariff barriers, political and foreign currency exchange risk, world trade, and U.S. trade policy.

  Online Service: NewsNet, Inc. (subscription required)
• FERIAS Y EXPOSICIONES - Current information
  Producer: Instituto de la Pequena y Mediana Empresa Industrial, Madrid, Spain (IMPI)

  Coverage: Contains detailed information on European Community trade fairs and expositions. (Language: Spanish)

  Online Service: IMPI

• FINANCIAL TIMES FULLTEXT - 1982 to date
  Producer: Financial Times Electronic Publishing

  Coverage: Provides in-depth information on industries, companies, and markets around the world, government regulations, and world trade.

  Online Service: DIALOG (File 622); Mead Data Central (subscription required); PROFILE Information (subscription required)

• FIRMEXPORT/FIRMIMPORT - Current information
  Producer: Paris Chamber of Commerce and Industry, Department of International Trade, in cooperation with other French Chambers of Commerce and Industry.

  Coverage: Information on French companies involved in international trade, importers, exporters, consultants, providers of services, products exported or imported, countries of export or import, means of transport used, and total export import figures. (Language: French)

  Online Service: Data-Star (FHIE); G.CAM Serveur; Paris Chamber of Commerce and Industry (TELEXPORT)

• FLASH - Current 4 months
  Producer: Istituto Nazionale per il Commercio Estero

  Coverage: Contains notices of trade opportunities for Italian companies, requests for Italian products, and bids for representation of foreign products in Italy. (Language: Italian)

  Online Service: Istituto Nazionale per il Commercio Estero

• FOODS ADLIBRA - 1974 to date
  Producer: General Mills, Foods Adlibra Publications, Minneapolis, MN
Coverage: Contains information on all new food products introduced since 1974; every section of food industry including retailers, processors, brokers, equipment, suppliers, and gourmet food importers; and general company and food association news.

Online Service: DIALOG (File 79)

• FOMAD (Food Market Awareness Database) - 1981 to date
  Producer: Leatherhead Food Research Association

  Coverage: International coverage of imports and exports, including information on marketing in the food and beverage industry. (Subscription required)

  Online Service: Leatherhead Food Research Association (LFRA)

• FOREIGN AGRICULTURAL SERVICE (FAS) UN TRADE SYSTEM - 1962 to date
  Producer: U.S. Department of Agriculture, Foreign Agricultural Service, Washington, DC

  Coverage: Database contains information on the United Nations’ "D-Series" data reported to the UN by its member countries. Information includes country profile report which provides the user with an abbreviated overview of a country’s agricultural import picture, trade balance table (available for both import and export profile), supply and distribution of agricultural products, and other export marketing information. Searches and printouts are provided on a cost-recovery basis.


• FOREIGN TRADE AND ECON ABSTRACTS - 1974 to date

  Coverage: Provides coverage on world economic literature and statistics on industries and markets.

  Online Service: BELINDIS (ECAB); Data-Star (IEAB); Rijks Computer Centrum (EVDA)

• GENERAL ACCOUNTING OFFICE BIBLIOGRAPHIC DATA BASE (GAO) - 1976 to date
  Producer: U.S. General Accounting Office, Washington, DC
Coverage: GAO reports cover a vast array of subjects. Searches are conducted by subject area and specific time period.

Access: When requesting information by mail: U.S. General Accounting Office, DHIS, P.O. Box 6015, Gaithersburg, MD 20877. (202) 275-6241.

When requesting assistance in person: U.S. General Accounting Office, RM 1000, 441 G Street NW, Washington, DC 20548

- GERMAN BUSINESS SCOPE - June 1985 to date
  Producers: High Tech Verlag GmbH; Predicasts

  Coverage: Covers trade, sales, and distribution opportunities between German and U.S. businesses.

  Online Service: Data-Star (PTBN); DIALOG (File 636); NewsNet, Inc. (subscription required)

- GLOBAL REPORT - Current information; earliest data from 1982; currency rate forecasts through 1994
  Producer: Business International Corp. New York, NY

  Coverage: Provides information on worldwide business and financial developments. Data is organized by country, market, industry or company. Provides complete country profiles.

  Diskette available from: Business International Corp.

- GREEN MARKETS - 1988 to date

  Coverage: Contains information on the U.S. chemical fertilizer industry, including economics, production, transportation, and research and development.

  Online Service: DIALOG (File 624); Dow Jones News/Retrieval

- INDUSTRY DATA SOURCES - 1979 to date
  Producer: Information Access Co., Belmont, CA

  Coverage: Contains information on bibliographic sources of financial and marketing data for 65 major industries in the U.S. and abroad, including marketing research reports, special issues of trade journals, economic forecasts, numeric databases, and investment banking studies.

  Online Service: DIALOG (File 189); Data-Star
• INFO-SOUTH - Current information  
Producer: University of Miami’s North-South Center and the Institute of InterAmerican Studies of the Graduate School of International Studies  
Coverage: Provides citations and abstracts of materials relating to contemporary economic, political, and social issues in Latin America. Coverage includes agriculture, banking, demography, development, ecology, economics, finance, foreign investment, foreign trade, marketing, science and technology, sociology, and transnational corporations.  
Online Service: University of Miami’s North-South Center and the Institute of InterAmerican Studies of the Graduate School of International Studies  

• INSTANT UPDATE - Current and previous day  
Producer: Professional Farmers of America  
Coverage: Contains data and news items relating to U.S. farm commodities prices. Covers news items on agriculture in the Soviet Union, Europe, Brazil, and Australia.  
Online Service: Professional Farmers of America  

• INTERNATIONAL ECONOMIC DATABASES - Current information  
Producer: Data Service & Information, Rheinberg, West Germany  
Coverage: Contains information on the economic situation in the European Community, as a whole, in each of its member countries, the United States, and Japan.  
Available on diskette: Data Service and Information, GMBH  

• THE INTERNATIONAL INFORMATION REPORT - September 1988 to date  
Producer: Washington Researchers Publishing  
Coverage: A newsletter which covers sources of free or low-cost business information worldwide. Also includes articles on various aspects of doing business abroad and other international business topics.  
Online Service: NewsNet, Inc. (subscription required)  

• INTERNATIONAL TRADE REPORTER - 1984 to date  
Producer: The Bureau of National Affairs, Inc. (BNA)
Coverage: Covers developments in international trade and actions of U.S. courts and federal agencies relating to imports and exports. Covers import competition and restrictions, export financing, trade agreements and negotiations, and foreign investment in the U.S.

Online Service: Mead Data Central, Inc. (INRAD) (subscription required); West Publishing Co. (BNA-BTR) (subscription required)

- IRISH COMPANY PROFILES - Current information
  Producer: EOLAS-The Irish Science & Technology Agency

  Coverage: Contains information on Irish companies from all economic sectors, including description of company activities and services, names of related companies, export status, and nationality of controlling interest.

  Online Service: Pergamon Financial Data Services (PFDS)

- KOMPASS EUROPE - Current information
  Producer: Reed Information Services, Ltd., Sussex, England

  Coverage: Provides business information including name, address, telephone number, management names, and product listings for approximately 210,000 European companies in 11 countries.

  Online Service: DIALOG (File 590)

- KOMPASS ISRAEL - Current information
  Producer: Kompass Israel, Ltd.

  Coverage: Contains information on Israeli companies including codes for products manufactured, distributed, imported, or exported.

  Online Service: Data-Star (KOIS); National Center of Scientific and Technological Information (COSTI)

- KOMPASS UK - Current information
  Producer: Reed Information Services, Ltd.

  Coverage: Covers Business and Industry Directories - U.K.

  Online Service: DIALOG (File 591); KOMPASS Online

- LATIN AMERICAN NEWSLETTERS - April 28, 1967 to date
  Producer: Latin American Newsletters, Ltd.
Coverage: Covers area studies, Latin American commodities, and economics.

Online Service: Mead Data Central, Inc. (LAN) (as a NEXIS database). (Subscription to Mead Data Central required)

- **m + a Messen-Planer-Datenbank - Current information**
  Producer: m + a Verlag fuer Messen, Ausstellungen und Kongresse GmbH

  Coverage: Contains detailed information about 4,500 trade fairs and exhibitions in 89 countries. (Language: German, with event names also in English)

  Online Service: GENIOS Wirtschaftdatenbanken

- **MANAGEMENT - September 1974 to date**
  Producer: Information Access Co., Foster City, CA

  Coverage: Contains information in finance, managerial economics, and marketing.

  Online Service: DIALOG (File 75); BRS

- **MEXICO SERVICE**
  Producer: International Reports, Inc. Supplied to online services by Predicasts.

  Coverage: Business and trade opportunities in Mexico.

  Online Service: DIALOG (File 636); Data-Star (PTBN). (Available as part of PTS NEWSLETTER DATABASE)

- **MARKETING SURVEYS INDEX - 1983 to date**
  Producer: Marketing Strategies for Industry (U.K.), Ltd. (MSI)

  Coverage: Contains citations, with abstracts, on business and economic research reports published worldwide.

  Online Service: PROFILE Information (subscription required)

- **MIDDLE EAST EXECUTIVE REPORTS - September 1978 to date**
  Producer: Middle East Executive Reports, Ltd.

  Coverage: Covers various aspects of conducting business in Middle Eastern countries. Includes business practices, import-export laws, and provides translations of recent Middle Eastern commercial laws and regulations affecting foreign businesses.
Online Service: Mead Data Central, Inc. (MDEAST)

- **NATIONAL TRADE DATABANK on CD ROM (NTDB)**
  
  For information: call U.S. Department of Commerce on (202) 377-1986 or NTIS on (703) 487-4630 (Reference NTIS # PB90-591740)

  Coverage: NTDB contains data on U.S. imports and exports; Government-sponsored market research by country and product; names and addresses of importers in foreign countries; foreign interest & exchange rates - stock price indexes; foreign labor costs and rates; import and export price indexes; world agricultural production, supply and distribution for major commodities; foreign direct investment; "how-to" manuals, and export regulations.


- **OFERES - Current information; total export volume-most recent 4 years**
  
  Producer: Instituto Espanol de Comercio Exterior

  Coverage: Contains trade data for export companies in Spain. Includes name, address of contacts, and export representative; including trade partners. (Language: Spanish)

  Online Service: Instituto Espanol de Comercio Exterior (ICEX)

- **PAESI ESTERI - Current information**
  
  Producer: Instituto Nazionale per il Commercio Estero

  Coverage: Contains information on foreign trade activities. Provides economic and financial data; information on currency, exchange rates, and customs; principal imports; and addresses of official trade representatives. (Language: Italian)

  Online Service: Istituto Nazionale per il Commercio Estero (ICE)

- **PAIS INTERNATIONAL - 1972 to date**
  
  Producer: Public Affairs Information Service, Inc., New York, NY

  Coverage: Includes such areas as multinational corporations, banking, labor, international trade, economics and social problems.

  Online Service: BRS; CD ROM/Silver Platter; DIALOG (File 49)
• PHARMACONTACTS - Current information
  Producer: PJB Publications, Ltd.

  Coverage: Contains information on pharmaceutical companies, animal-related health companies, agrochemical/crop protection companies, pharmaceutical regulatory agencies, agrochemical regulatory and research agencies, and agencies concerned with veterinary medicine.

  Online Service: BRS; BRS Colleague; Data-Star (PHCO)

• PIERS EXPORTS (U.S. Ports) - June 1989 to present


  Online Service: DIALOG (File 571, 572)

• PIERS IMPORTS (U.S. Ports) - June 1989 to present

  Coverage: Provides identification of new sources of supply for imports, monitoring supply for imports, monitoring imports of products, and identification of potential trade partner. Includes: name and location of overseas shipper; name, city, and State of U.S. consignee; product description; standardized commodity description; Piers product code; date of arrival in U.S. port; cargo weight in pounds; U.S. port’s name and code; overseas: country name and code; and packaging.

  Online Service: DIALOG (File 573, 574)

• RUSSIA EXPRESS-PERESTROIKA: EXECUTIVE BRIEFING - April 1989 to date
  Producer: International Industrial Information, Ltd.

  Coverage: Covers the Soviet business environment in relation to "perestroika." Includes information on the business climate, non-Soviet investment in the former Soviet Union, and opportunities for companies.

  Online Service: Data-Star (PTBN); DIALOG (File 636)
• TAIWAN ON-LINE BUSINESS DATA SERVICES - 1982 to date
  Producer: F.B.R. Data Base Inc.

  Coverage: Contains five files of Asian business and corporate
  information: Newscan; Directory of Companies; Corporate Reports;
  Company Product/Technology; and Importers (lists Taiwanese agents
  for overseas suppliers). (subscription required)

  Online Service: F.B.R. Data Base Inc.

• TRADE AND INDUSTRY INDEX - 1981 to date
  Producer: Information Access Co., Forster City, CA

  Coverage: Provides current and comprehensive coverage of major
  trade journals and industry-related periodicals. Covers business and
  trade information, forestry and paper products, agriculture, and
  banking.

  Online Service: BRS; DIALOG (File 148)

• TRADER - March 1988 to date
  Producer: Bechelli, Harris & Asociados

  Coverage: Provides information on import and export opportunities
  and trade fair calendar. Sources include government agencies,
  embassies, and chambers of commerce.

  Online Service: TOTAL-NET

• TRADSTAT WORLD TRADE STATISTICS - 1981 to date
  Producer: Data-Star

  Coverage: Contains annual and monthly time series on imports and
  exports of over 60,000 commodities and products between 16 major
  trading countries and their trading partners.

  Online Service: Data-Star

• UK IMPORTERS - 1989 to date
  Producer: Data-Star

  Coverage: Covers U.K. importers and the products they import,
  including product code and name, and importing company name and
  address.

  Online Service: Data-Star (UKIA, UKIM)
• UPDATE/THE AMERICAN STATES - January 15, 1981 to date

  Coverage: Contains information on economic directions and business climates in the U.S., on a State-by-State basis, including marketing opportunities, new laws and legislation, and state business profiles.

  Online Service: Mead Data Central, Inc. (AMSTAT)

• USDA EDI SERVICE - Current information
  Producer: U.S. Department of Agriculture (USDA), Office of Public Affairs

  Coverage: Contains information prepared by the U.S. Department of Agriculture and its agencies; includes national and state agricultural statistics; reports on world agricultural trade from the Foreign Agricultural Service; the OUTLOOK AND SITUATION SUMMARY from the Economic Research Service; commodity analyses from the Cooperative Extension Services. Also included are: a calendar of meetings, conferences, and exhibitions sponsored by the USDA, agricultural agencies, and related organizations.

  Online Service: Martin Marietta Data Systems

• USSR BUSINESS - August 1990 to date
  Producer: Stamm Publishing, Ltd.

  Coverage: Covers business and trade opportunities in the Former Soviet Union.

  Online Service: NewsNet, Inc. (subscription required)

• WORLD BANK INTERNATIONAL BUSINESS OPPORTUNITIES SERVICE - June 1986 to date
  Producer: World Bank, Washington, DC

  Coverage: Provides information on international finance and on projects for which the World Bank funding is being sought.

  Online Service: PROFILE Information
WORLD TRADE CENTER NETWORK - Current information
Producer: World Trade Centers Association, Inc. (WTCA)

Coverage: Covers international countertrading, business, and trade opportunities

Online Service: I.P. Sharp Associates. (Access limited to organizations affiliated with world trade centers.)

Online Service Providers

Agra Europe (London) Ltd.
25 Frant Road
Tunbridge Wells
Kent TN2 5JT
England
Phone: 44(892) 33813
FAX: 44(892) 24593

AgriData Network
AgriData Resources, Inc.
330 East Kilbourn Avenue
Milwaukee, WI 53202
Phone: (414) 278-7676 or (800) 558-9044
FAX: (414) 273-5580

Al Bayan Press
The Arab Information Bank
Commercial Department
P.O. Box 2710
Dubai
United Arab Emirates
Phone: 971(4)444400
FAX: 971(4)441854

ATI-Net
California State University, Fresno
2910 East Barstow Avenue
Fresno, CA 93740-0115
Phone: (209) 278-4872
FAX: (209) 278-4849

Aviation/Aerospace Online
A Division of McGraw Hill
1156-15th Street NW
Washington, DC 20005
Phone: (202) 822-4625
FAX: (202) 293-2682 or 293-7482
Computer Aided Marketing Programs, Inc. (CAMP)
CSIRO AUSTRALIS
CSIRO Information Resources Branch
314 Albert Street
East Melbourne, VIC 3002
Australia
Phone: 61(3)418-7333
FAX: 61(3)419-0459

Datalex, S.A.
Paseo de la Castellana 83-85
28046 Madrid
Spain
Phone: 34(1)455-6964

Data Service and Information, GMBH
P.O. Box 1127
D-4134 Rheinberg 1
Germany

Data-Star
D-S Marketing Limited
Plaza Suite
114 Jermyn Street
London SW 1Y 6HJ
England
Phone: 44(71)930-7646
in U.S.: (800) 221-7754
FAX: 44(71)930-2581

DIALOG Information Services, Inc.
3460 Hillview Avenue
Palo Alto, CA 94304
Phone: (415) 858-3785 or (800) 334-2564
FAX: (415) 858-7069

DIMDI
Weiss hausstrasse 27
Postfach 420580
5000 Cologne 41
Germany
Phone: 49(221)47241
FAX: 49(221)411-429
Doane Information Services  
11701 Borman Drive, Suite 100  
St. Louis, MO  63146  
Phone: (314) 569-2700  
FAX: (314) 569-1083

Dow Jones News/Retrieval  
Dow Jones & Company, Inc.  
P.O. Box 300  
Princeton, NJ  08543-0300  
Phone: (609) 520-4000  
FAX: (609) 520-4775

DRI/McGraw-Hill  
Data Products Division Headquarters  
1750 K Street NW, 10th Floor  
Washington, DC 20006  
Phone: (202) 663-7720  
FAX: (202) 663-7800

Economic Commission for Latin American and the Caribbean (ECLAC)  
Subregional Headquarters for the Caribbean  
22 St. Vincent Street  
P.O. Box 1113  
Port of Spain  
Trinidad and Tobago  
Phone: (809) 623-7308  
FAX: (809) 623-8485

Economic Research Service  
U.S. Department of Agriculture  
1301 New York Avenue  
Washington, DC  20005-4789  
Phone: (202) 219-0504

EDICLINE  
Economic Documentation and Information Centre Ltd.  
Botany House  
Cairnie by Huntly, AB5 4TX  
Scotland  
Phone: 44 46687-259

ESA-IRS  
Via Galileo Galilei  
00044 Frascati  
Italy  
Phone: 39(6)941801  
FAX: 39(6)94180361
Eurobases
200 Rue de le Loi
1049 Brussels
Belgium
Phone: 32(2)235-0001
FAX: 32(2)236-0624

Euromoney Online
Euromoney Publications, Ltd.
Nestor House
Playhouse Yard
London EC4V 5EX
England
Phone: 44(71)236-3288

Executive Telecom System, Inc. (ETSI)
The Human Resource Information Network
9585 Valparaiso Court
Indianapolis, IN 46268-1130
Phone: (317) 872-2045 or (800) 421-8884
FAX: (317) 872-2059

Export Network Limited
Regency House
1-4 Warwick Street
London W1R 5WA
England
Phone: 44(71)494-4030
FAX: 44(71)494-1245

F.B.R. Data Base Inc.
9-16 Nan Kan Hsia, 15 Lin
Nan Kan Village
Lu Chu Hsiang
Tao Yuan County
Taiwan

FIZ Technik
Ostbahnhofstrasse 13
Postfach 60 05 47
6000 Frankfurt am Main 1
Germany
Phone: 49(69)4308-225
FAX: 49(69)4308-200
Forecast Plus
DRI/McGraw-Hill
1750 K Street NW, Ninth Floor
Washington, DC 20006
Phone: (202) 663-7600 or (800) 933-3374

G.CAM Serveur
Europeenne de Donnees
1 rue du Boccador
75008 Paris
France
Phone: 33(1)47208834
FAX: 33(1)47201143

GENIOS Wirtschaftsdatenbanken
P.O. Box 1102
Kasernenstrasse 67
4000 Duesseldorf 1
Germany
Phone: 49(211)8871524
FAX: 49(211)887152

IMPI (Instituto de la Pequena y Mediana Empresa Industrial)
Paseo de la Castellana 141
28046 Madrid
Spain
Phone: 34(1)5829300
FAX: 34(1)5712831

Infomart Online
1450 Don Mills Road
Don Mills, Ontario M3B 2X7
Canada
Phone: (416) 445-6641 or (800) 668-9215
FAX: (416) 445-3508

Information Plus
McGraw-Hill (DRI)
1750 K Street NW, Ninth Floor
Washington, DC 20006
Phone: (202) 663-7600 or (800) 933-3374

Infotrade
A. Gossetlaan 32a
1720 Groot-Bijgaarden
Belgium
Phone: 32(2)4666480
FAX: 32(2)4666970
Instituto Español de Comercio Exterior (ICEX)
Paseo de la Castellana 14
28046 Madrid
Spain
Phone: 34(1)4311240
FAX: 34(1)4316128

International Atomic Energy Agency (IAEA)
Vienna International Centre
P.O. Box 100, Wagramerstrasse 5
1400 Vienna
Austria
Phone: 43(1)23602789
FAX: 43(1) 234564

INVESTEXT/PLUS
Thomson Financial Networks
11 Farnsworth Street
Boston, MA 02210
Phone: (617) 345-2000 or (800) 662-7878
FAX: (617)330-1986

I.P. Sharp Associates (a Reuter Company)
Hong Kong Limited
1801 Bank of America Tower
12 Harcourt Road
Hong Kong, Hong Kong

Istituto Nazionale per il Commercio Estero (ICE)
Via Liszt 21
Rome
Italy
Phone: 39(6)59921

Juridial
1 rue du Boccador
75008 Paris
France
Phone: 33(1) 47208834

Knowledge Index
DIALOG Information Services
3460 Hillview Avenue
Palo Alto, CA 94304
Phone: (415) 858-3785 or (800) 334-2564
FAX: (415) 858-7069
KOMPASS Online
Windsor Court
East Grinstead House
East Grinstead
West Sussex RH 10 1XA
England
Phone: 44(342)326 972
FAX: 44(342)315 310

Leatherhead Food Research Association (LFRA)
Randalls Road
Leatherhead
Surrey KT22 7RY
England
Phone: 44(372) 376761
FAX: 44(372) 386228

Martin Marietta Data Systems
4701 Forbes Boulevard
Lanham, MD  20706
Phone: (301) 306-8000
FAX: (301) 306-8028

Mead Data Central, Inc.
P.O. Box 933
Dayton, OH  45401
Phone: (513) 865-6800 or (800) 227-4908
FAX: (513) 865-6909

National Center of Scientific and Technological Information (COSTI)
Ministry of Energy and Infrastructure
Atidim Industrial Park
P.O. Box 43074
Tel-Aviv 61430
Israel
Phone: 972(3)492037
FAX: 972(3)492033

National Technical Information Service (NTIS)
Office of Product Management, F300
5285 Port Royal Road
Springfield, VA  22161
Phone: (703) 487-4929
FAX: (703) 321-8199
NewsSource
Informart Online
Southam Electronic Publishing
1450 Don Mills Road
Don Mills, Ontario M3B 2X7
Canada
Phone: (416) 445-6641 or (800) 668-9215
FAX: (416) 445-3508

NewsNet, Inc.
945 Haverford Road
Bryn Mawr, PA 19010
Phone: (215) 527-8030 or (800) 345-1301
FAX: (215) 527-0338

Paris Chamber of Commerce and Industry (TELEXPORT)
Department of International Trade
2 rue de Viarmes
75002 Paris
France
Phone: 33(1)45083600
FAX: 33(1) 45083580

Pergamon Financial Data Services
MBC Information Services, Ltd.
Paulton House
8 Shepherdesswalk
London N1 7LB
England
Phone: 44(71)490-0049
FAX: 44(71)253-1308

Professional Farmers of America
219 Parkade
Cedar Falls, IA 50613
Phone: (319) 277-1278 or (800) 553-1781

PROFILE Information
P.O. Box 12
Sunbury-on-Thames
Middlesex TW 16 7UD
England
Phone: 44(932)761444
FAX: 44(932)781425
QL Systems, Ltd.
901 St. Andrew's Tower
275 Sparks Street
Ottawa, Ontario K1 R 7X9
Canada
Phone: (613) 238-3499
FAX: (613) 548-4260

Reuters, Ltd.
85 Fleet Street
London EC4P 4AJ
England
Phone: 44(71)250-1122

Rijks Computer Centrum (RCC)
Fauststraat 1
7323 BA Apeldoorn
The Netherlands
Phone: 31(55)778822
FAX: 31(55)215960

SIRIO
Via Orazio 2
Milan
Italy
Phone: 39(2)882-31

Statistica
10 Boulevard Voltaire
75011 Paris
France
Phone: 33(1)48051065
FAX: 33(1)43383490

TOTAL-NET
S.G.M. Computacion S.A.
Talcahuano 38 Piso 4
1013 Buenos Aires
Argentina
South America
Phone: 54(1)37-7644

University of Miami
INFO-SOUTH
P.O. Box 248014
Coral Gables, FL 33124-3211
Phone: (305) 284-4414 or (800) 752-9567
FAX: (305) 284-6370
Glossary

**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 that they can be loaded aboard the ship.

**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 coastal waters.

**Carrier**—The company that transports goods from one point to another. May be a vessel, airline, trucking company, or railroad.

**Consignee**—The person or firm to whom something is sold or shipped. Buyer or importer.

**Consignor**—The person or firm from whom the goods have been received for shipment. Seller, shipper, or exporter.

**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.
C & F--"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.

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.

C.I.F.--"Cost, insurance, 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.

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 and reduce losses due to breakage, spoilage, and pilferage than more traditional shipment methods.

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.

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.

F.A.S.--"Free alongside"--A pricing term indicating that the quoted price includes the cost of delivering the goods alongside a designated vessel.

F.O.B.--"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. (A freight forwarder is among the best sources of information and assistance on U.S. export regulations and documentation, shipping methods, and foreign import regulations.)

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.

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.

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 bulk commodity less than the amount needed to fill a container.
Liner conference--An agreement among shippers who regularly serve a particular trade route to establish stable freight rates and to improve working conditions in that trade.

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.

Non-vessel operating common carrier (NVOCC)--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, 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. Also 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 that 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.

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 run under mutually agreed upon freight rates.

Stowage--The loading of a vessel by handling and placing goods so as to ensure stability of the vessel, 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 of all rules, rates, and charges for the movement of goods.

Tramp streamer--A ship not operating on regular routes or schedules.

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


(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*. 2nd ed. Washington, DC.


(24) "10 Questions To Ask When Choosing a Freight Forwarder."  AgExporter.  USDA, AMS, January 1991.


