



Packaging Perishable Shipments

To help prevent spoilage and maintain product integrity, follow these instructions for shipping your perishable items via FedEx Express® services.



Preparing Perishable Items for Shipment

Perishable products may be subjected to harsh environmental conditions, such as excessive temperature or humidity, on the way to their destination. To access the FedEx portfolio of temperature-controlled solutions, go to **fedex.com/us/temp-assure**. If you choose to use your own packing materials, protect your products by carefully packing to provide appropriate temperature protection and stability.

During shipping, insulation and refrigerants are key to preserving products like seafood, plants, meat, and fruits as well as dairy, medical, and chemical products. With the proper combination of insulation and refrigerants, you can maintain products within specific temperature ranges. You can keep products frozen, or prevent products from freezing. You can prevent melting and thawing in hot weather and minimize the effects of short-term temperature variations. We'll show you how.

Insulation

We recommend insulation to reduce the transfer of heat through packaging container walls. The most common insulation materials are expanded polystyrene (EPS) foam, rigid polyurethane foam, and reflective materials (radiant barrier films).

Refrigerants

We recommend refrigerants such as gel coolants and dry ice* to keep perishable products cold or frozen. However, do not use dry ice as a refrigerant for live seafood such as lobsters; use gel coolants instead. Wet ice has many disadvantages, including weight and special water-resistant packaging requirements, but it may be used if properly prepared to prevent leakage.

General Guidelines for Packaging Perishables

- Package shipments to withstand handling in different orientations.
- Use a refrigerant that will keep products within the required temperature range. Use gel coolants for refrigerating products between 32°F (0°C) and 60°F (16°C). Use dry ice* for frozen items.

* Dry ice (carbon dioxide solid, UN 1845) is considered a dangerous good/hazardous material for air transport and requires special handling. See "Dry Ice Shipping Regulations" for details.

- Use insulated foam containers with a minimum of 1-1/2"-thick walls.
- Bag perishable products that can melt or thaw, or shipments that contain liquid, using minimum 2-mil watertight plastic bags.
- Place foam containers inside sturdy outer containers.
- Include the address and 24-hour phone number of both the shipper and the recipient on each shipping label.

Express Service Recommendations

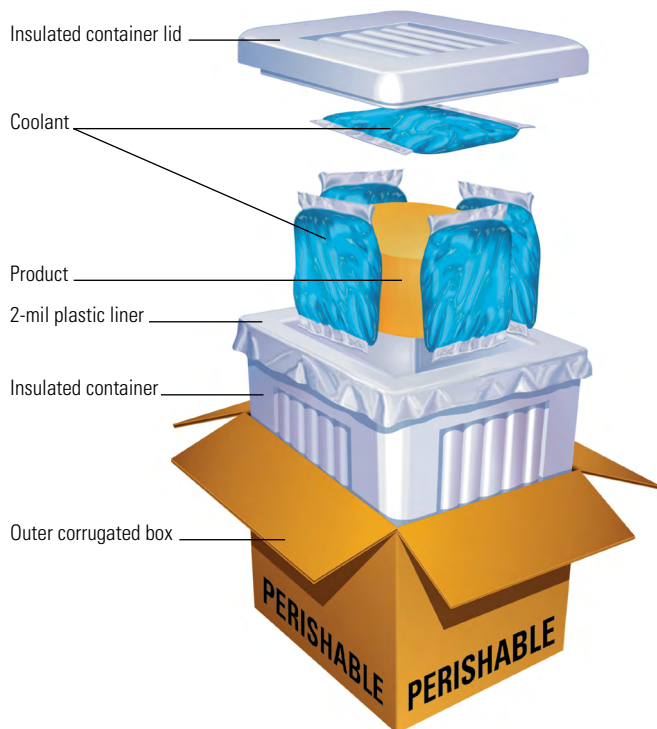
- We recommend that you package perishables for a minimum transit time of 30 hours and ship them via FedEx First Overnight®, FedEx Priority Overnight®, FedEx Standard Overnight®, or FedEx 1Day® Freight.
- The maximum acceptable gross weight per package for most FedEx Express overnight services is 150 lbs., including packaging and refrigerant.
- For overnight shipment of packages with a gross weight of 151 to 2,200 lbs. each, use FedEx 1Day Freight.
- FedEx does not recommend shipping perishables via FedEx 2Day®, FedEx 2Day® Freight, or FedEx Express Saver®, but if you choose to you should package shipments for at least 12 hours more than the delivery commitment time.
- Avoid shipment of perishable items on days that will require transit on a weekend or over a holiday period.

How to Keep Products Refrigerated During Transit

Gel coolants are preferable to wet ice.

- Freeze the coolants according to the manufacturer's guidelines.
- Precool the insulated container, if possible.
- If your shipment contains liquid or perishable products that could contain liquids, double-bag the products using minimum 2-mil watertight plastic bags and line the inside of the foam container with a minimum 2-mil plastic liner and absorbent material.
- Arrange products inside the insulated container, allowing space for coolants.
- Place a sufficient number of coolants on top of and around the product.
- Fill all void space with dunnage such as loosefill peanuts to prevent product movement.
- Close the liner bag securely.
- Place the insulated container inside a corrugated outer box.
- Close and securely seal the corrugated box with pressure-sensitive plastic tape. Apply the tape over all box flaps and seams.

Packaging Perishable Shipments With Gel Coolants



Bag Closure Instructions

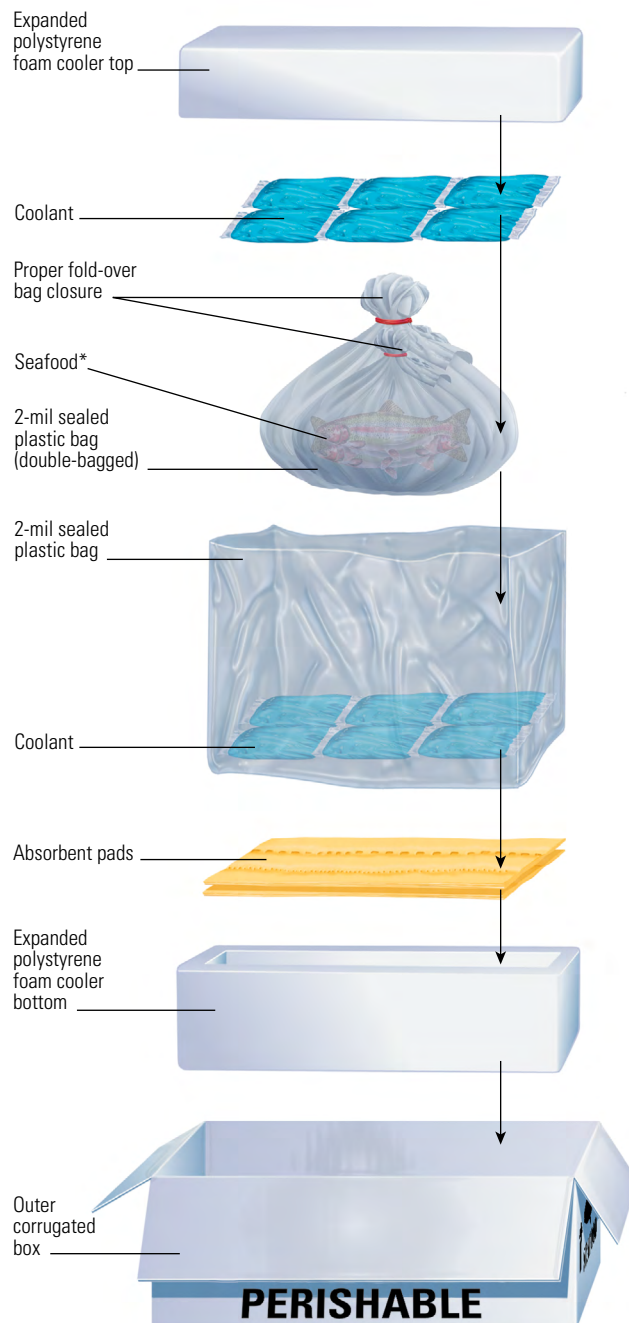


Twist end of bag tightly.

Fold over.

Wrap rubber band securely around fold-over to ensure closure.

Packaging Seafood Shipments With Gel Coolants



* When shipping live edible seafood (lobsters, oysters, crabs), use gel coolants and follow the same packaging steps except do not seal the bags.

How to Keep Products Frozen During Transit

- Freeze products before packaging.
- Precool the insulated container, if possible.
- If the shipment contains liquid or perishable products that can melt or thaw, bag the products or line the insulated container using a minimum 2-mil watertight plastic bag.
- When arranging products inside the insulated container, allow enough space for dry ice.
- Place a sufficient amount of dry ice in the insulated container on top of and around the products.
- Fill void spaces with dunnage material such as loosefill peanuts.
- Close the liner bag (if used) but do not completely seal it, as the carbon dioxide gas created by the dry ice must be allowed to vent.
- Place the lid on the insulated container.
- Place the insulated container inside an outer corrugated box.
- Close and securely tape the box with pressure-sensitive plastic tape. Apply tape to all flaps and seams.
- Complete the required paperwork, dangerous goods labeling, and markings.

Dry Ice Shipping Regulations

Dry ice (or carbon dioxide solid, UN 1845) is considered a dangerous good/hazardous material for air transport and requires special handling. Shippers are also required to have function-specific dangerous goods training as outlined in 49CFR (Code of Federal Regulations) 172.700.

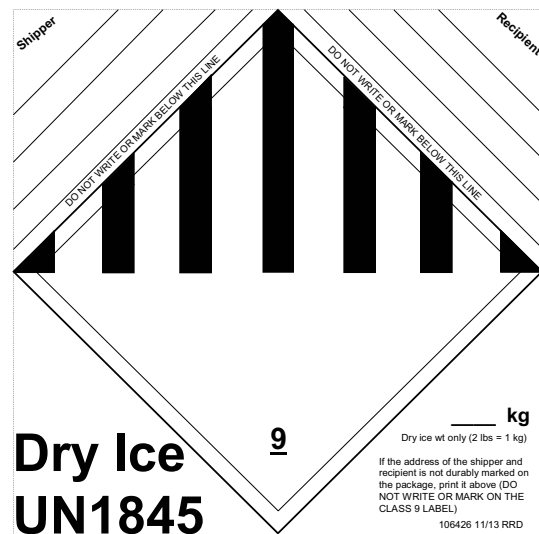
When dry ice changes to carbon dioxide gas in enclosed spaces like aircraft cargo holds, it displaces oxygen. The design and construction of packaging used for dry ice shipments must prevent the buildup of pressure that could cause rupturing. Dry ice must never be placed in an airtight container.

When shipping with dry ice, you must provide correct identification, classification, markings, and labeling on your outer carton to comply with current requirements in the International Air Transport Association (IATA) dangerous goods regulations.

The following permanent markings are required on the outer packaging of all IATA dry ice shipments:

- "Dry Ice" or "Carbon Dioxide Solid."
- "UN 1845."
- Net weight of dry ice in kilograms.
- Name and address of the shipper.
- Name and address of the recipient.

FedEx Dry Ice Label (not required for FedEx Ground® shipments)

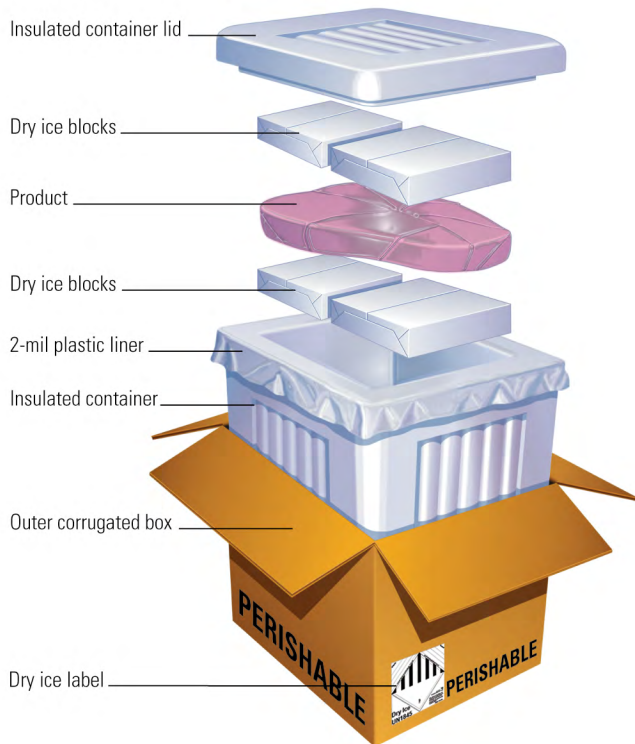


An IATA Class 9 Miscellaneous label must appear on all dry ice shipments. FedEx Express offers a dry ice label that, when correctly completed, satisfies the IATA marking and labeling requirements, available free of charge at [fedex.com](https://www.fedex.com) or by calling 1.800.GoFedEx 1.800.463.3339.

Whether you use online shipment processing at **fedex.com** or a FedEx airbill, select “Dry Ice” on your documentation and complete the dry ice information. In addition, mark “Yes, Shipper’s Declaration not required” in the Special Handling section on the airbill.

If you have questions or need more information about dry ice shipments, call the FedEx Dangerous Goods/Hazardous Materials Hotline at 1.800.GoFedEx 1.800.463.3339; press “81” or say “dangerous goods,” then press “4” for the next available dangerous goods agent.

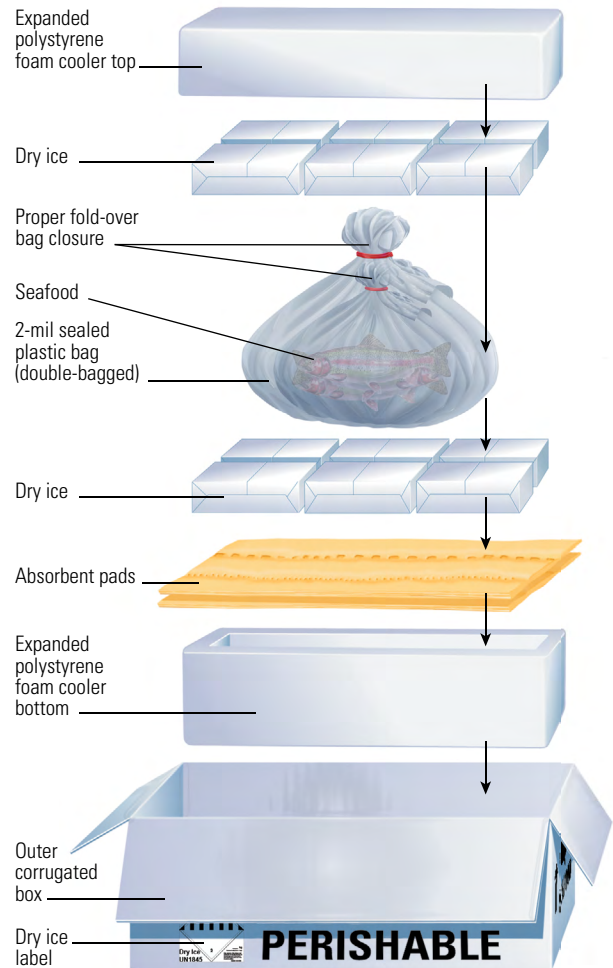
Packaging Perishable Shipments With Dry Ice



Additional Requirements for Shipping Frozen Seafood

- Double-bag seafood in minimum 2-mil plastic bags, with each bag individually sealed using the fold-over method.
- Place adequate absorbent material such as pads, cellulose wadding, or paper towels in the bottom of the foam container to absorb any liquids.

Packaging Frozen Seafood Shipments With Dry Ice

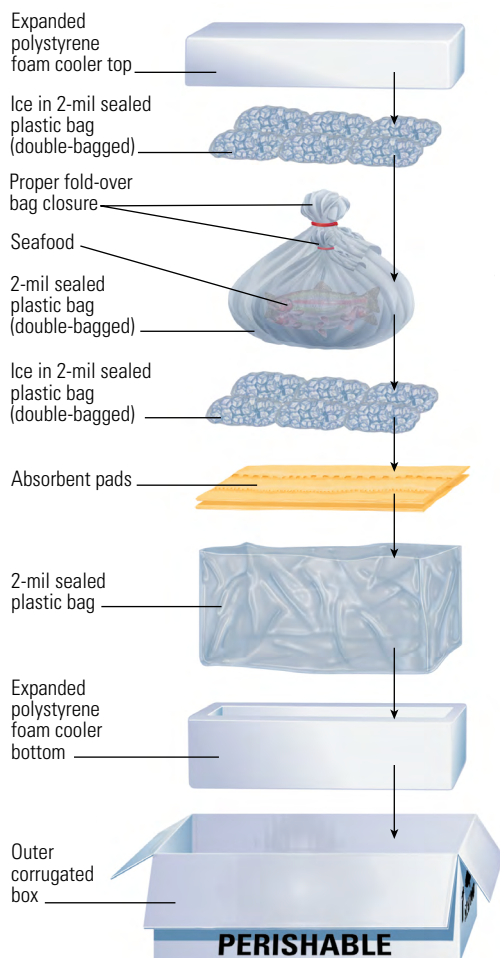


Shipping Seafood With Wet Ice

FedEx does not recommend the use of wet ice (frozen water) as a refrigerant. If you believe wet ice is necessary, you must prepare it to prevent the leakage of any liquid, regardless of orientation.

- Double-bag seafood in minimum 2-mil plastic bags, with each bag individually sealed using the fold-over method.
- Double-bag the ice in minimum 2-mil plastic bags, with each bag individually sealed using the fold-over method.
- Line the insulated container using a minimum 2-mil watertight plastic bag.
- Place adequate absorbent material such as pads, cellulose wadding, or paper towels in the bottom of the foam container to absorb any liquids.
- Follow all other packaging requirements for seafood shipments.
- Ship via FedEx Priority Overnight service only.

Packaging Seafood Shipments With Wet Ice

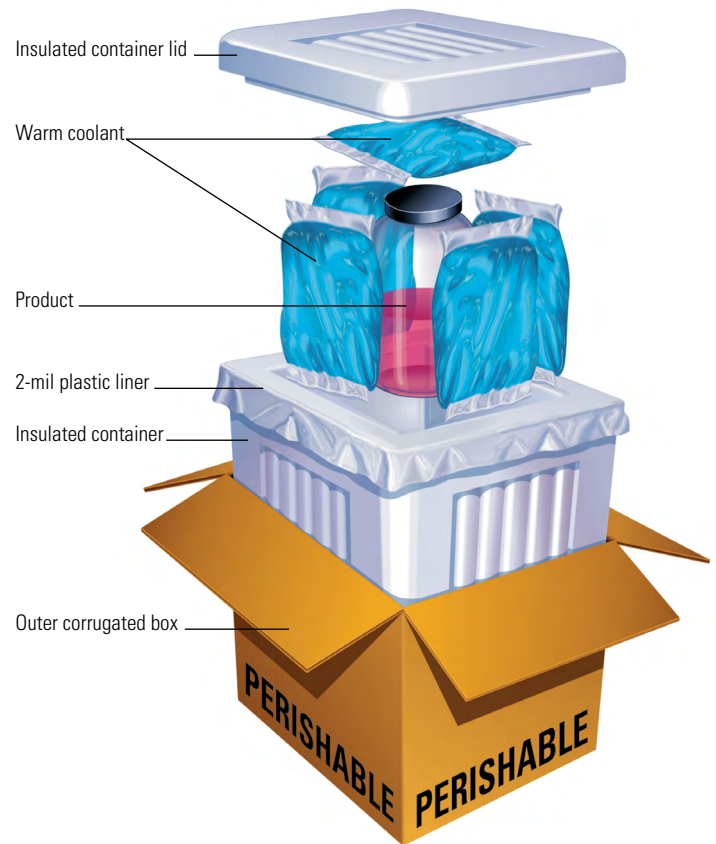


How to Protect Products From Freezing

You can help protect your products from low temperatures or freezing by using “heat sinks,” which help maintain desired temperatures. Gel coolants make good heat sinks.

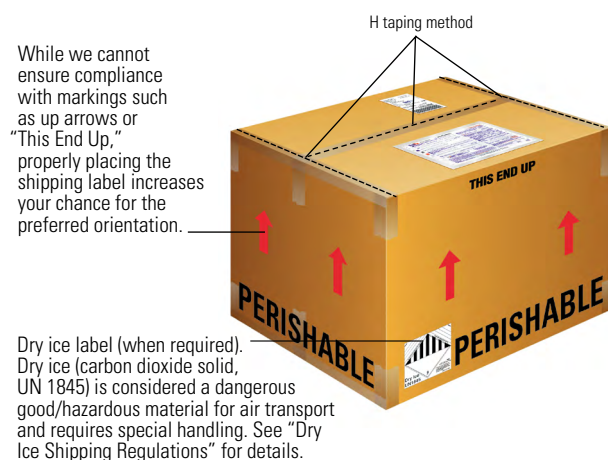
- Place your products inside an insulated container and surround them with room-temperature (about 72°F) gel coolants to reduce the risk of freezing.
- Fill all void space with dunnage such as loosefill peanuts to prevent product movement.
- Ship the insulated container inside a corrugated box.

Packaging Perishables to Prevent Freezing



Sealing and Labeling Instructions

- Apply at least three strips of pressure-sensitive adhesive plastic tape that is at least 2" wide to both the top and bottom of the carton.
- Tape all seams or flaps using the H taping method.
- Place the shipping label on the top of the largest surface.
- Mark your outer container "Perishable."



FedEx Cold Shipping Packaging Solutions

Keep your temperature-sensitive shipments cold with the cold shipping package offered by FedEx, and avoid the weight, hassle, and expense of gel packs.

The package includes a chilling unit activated by the shipper and placed in the box with the shipment. The unit continuously evaporates small amounts of water at low pressure, keeping the shipment at 2°C to 8°C for up to 48 or 96 hours,* depending on the packaging option you choose.

The FedEx cold shipping package allows you to maintain a consistently cold temperature with no special training and affords high levels of shipment integrity.

*Actual cooling duration varies, depending on external temperatures.

Sophisticated Technology for Deep-Frozen Shipments

The FedEx® Deep Frozen Shipping Solution is an easy-to-use technology that eliminates the shipping challenges associated with a dangerous goods classification. It's a safe, cost-effective way to ship high-value, temperature-sensitive items — without the need to buy your own packaging or equipment.

Features include:

Cryogenic: At or below -150°C.

Multiple sizes: The standard dry shipper holds approximately 75 1.8- or 2.0-milliliter vials; the large-volume version holds approximately 500 vials.

Advanced tracking, monitoring, and care: With every shipment, you automatically receive FedEx Priority Alert® service, which provides proactive monitoring and intervention, if needed, from origin to destination.

FedEx Deep Frozen Shipping Solution is contract only.

To learn more and get set up, please contact your FedEx account executive or call 1.800.GoFedEx 1.800.463.3339 to speak with a customer service representative.

The FedEx Express Transportation Environment

Perishable products must withstand various temperature conditions in the FedEx Express shipping environment.

The cargo areas of our vans and trucks are not temperature-controlled, and temperature will vary depending on time of year, location, exposure to sunlight, and other variables. In summer months the temperature in the cargo area of ground vehicles can be as much as 30 degrees Fahrenheit higher than the ambient temperature outside the vehicle.

On board FedEx Express aircraft, temperatures vary depending on the type of aircraft, the location of each cargo compartment and the package location within each compartment, the length of flight, and the cruising altitude. For general reference, temperatures aboard most wide-body aircraft main cargo compartments vary between 40°F (5°C) and 85°F (30°C). Packages positioned in the bulk department, next to the aircraft's outer structure, might be exposed to temperatures as low as 35°F (2°C) during flight, but could be subjected to temperatures as low as 20°F (-7°C) during international flights.

Air pressures on FedEx Express aircraft vary from as low as 8.3 psi at cruise altitude to as much as 14.7 psi on the ground.

FedEx Package Testing and Design Services

We offer complimentary package testing and evaluation services that can help you predict packaging performance and avoid product spoilage. We encourage you to submit a sample of your perishables packaging for testing and evaluation.

Testing Request Guidelines

Follow these steps for submitting your packaging for testing. An active FedEx account number is required. You and your FedEx account executive should expect testing results via email in approximately five to seven business days from FedEx Packaging Lab's receipt of your packaging.

1. Obtain a FedEx Packaging Test Application at **fedex.com/packaging** or by contacting FedEx Packaging Lab at packagingservices@fedex.com or 1.800.633.7019.
2. Complete and sign your application, referencing the name of your FedEx account executive on the form. See the FedEx Packaging Test Application for terms governing test or design.
3. Prepare a sample test package including all the packaging components and contents in the exact configuration you intend to send to your customer.
4. Place your completed application, your sample test package labeled "Test This Package," and any necessary cushioning material in a sturdy outer container marked "Overpacked/Test Pkg. Inside."
5. Send your shipment to the address indicated on the FedEx Packaging Test Application.

Contacts and Resources

- *How to Pack* guidelines at **fedex.com/packaging**.
- FedEx portfolio of temperature-controlled solutions at **fedex.com/us/temp-assure**.
- FedEx Packaging Lab, packagingservices@fedex.com or 1.800.633.7019.
- FedEx Dangerous Goods/Hazardous Materials Hotline, 1.800.GoFedEx 1.800.463.3339; press "81" or say "dangerous goods," then press "4" for the next available dangerous goods agent.
- Additional information and services at **fedex.com/us/perishables**.

NOTICE: This packaging brochure is provided to FedEx customers to help reduce loss or damage due to improper packaging. It is NOT intended to be a comprehensive guide for packaging items we accept for transit. We make no warranties, expressed or implied, regarding this information. Proper packaging is the sole responsibility of the shipper. For more information and additional guidelines, go to the packaging tips page at **fedex.com/packaging**, email packagingservices@fedex.com, or contact FedEx Packaging Lab at 1.800.633.7019. Refer to the current FedEx Service Guide for terms, conditions, and limitations applicable to FedEx® delivery services.

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