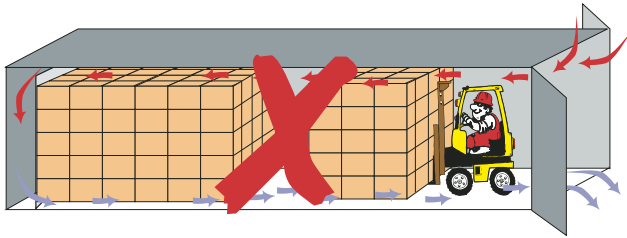


Loading a Reefer to Optimize Quality



Do not run reefer with doors open

When the ambient temperature is warmer than the cargo, operating the reefer with the rear doors open will not cool down the cargo. The introduction of hot ambient air will heat up the cargo instead.

When hot humid air enters the reefer, moisture condenses on the cold cooling coil and turns to ice. Ethylene entering the reefer from genset exhaust may cause ripening of fresh produce. Exhaust odor may give product off flavors. Cooled air escapes out the rear door and the cycle continues.

Once loading is complete and the doors are closed, the reefer could run for hours with a partially iced up cooling coil, reducing its cooling effect and putting the cargo in danger until the unit completes a defrost cycle.

Packaging frozen & chilled non-live products

Frozen and most chilled non-live products do not require air holes in the top and bottom of the cartons. Air flowing around the load is sufficient to remove heat that has penetrated into the container. The cartons should be stacked directly on top of each other to take advantage of their strength in the corners. If palletized, the corners of each carton should be supported directly by the pallet (see Figure A).

Packaging chilled live fresh fruits, vegetables and ornamentals

- Cartons require airflow holes on top and bottom so that when stacked they align with adjacent cartons (see Figure A). The number, placement, size and shape of the air holes are determined by the product being packaged.

- If transporting with humidity control, use wax impregnated cardboard or other materials that will not lose strength in high humidity environments.
- The strength of a carton is in its corners. Stack cartons directly on top of each other to minimize crushing of the carton below.

If loading cargo on pallets

- Place cartons on the pallets so that air flows up into the cartons unrestricted.
- The corners of each carton should be supported directly by the pallet.
- If wrapping pallets with plastic to provide stability, do not cover bottom or top of cartons.

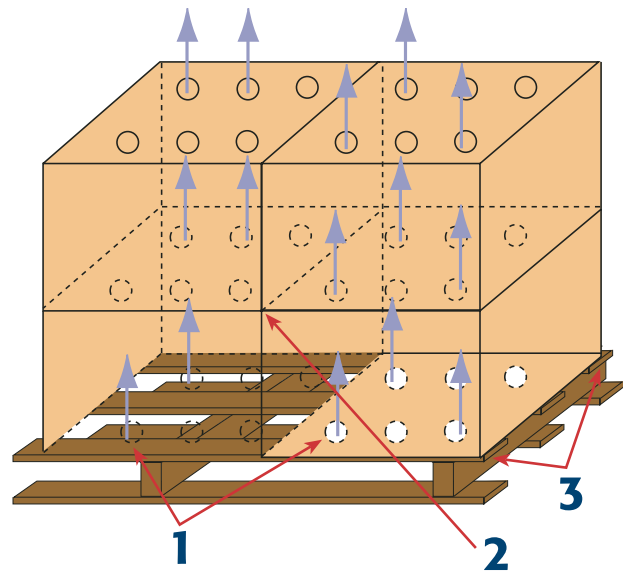


Figure A: 1. Carton alignment for unrestricted air flow.
2. Strength of cartons in the corners.
3. Corners of cartons supported.

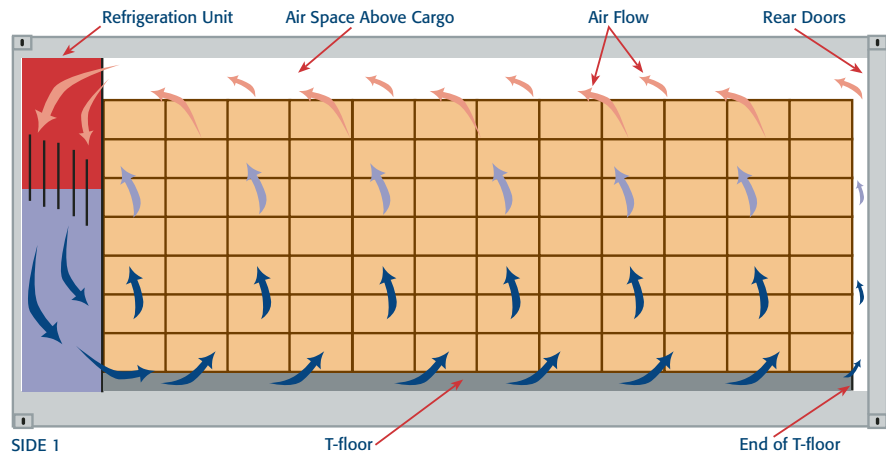
Diagrams courtesy of
Patrick E. Brecht,
P.E.B. Commodities, Inc.

Loading a Reefer to Optimize Quality

The DOs and DO NOTs of stuffing airflow reefers.

General Reefer Cargo Check List – DO:

- Follow "Frozen" or "Chilled" cargo specifics as required (below).
- Assure floor and drains are free of debris.
- Block stow entire load in register.
- Assure weight is distributed evenly in container for maximum stability.
- Cover the entire floor.
- If palletized, place dunnage in center channel between pallets.
- Block and brace cargo as necessary.
- Ensure total weight of cargo, container, chassis, genset and truck are within legal limits.
- Set unit at optimal carrying temperature.



- Do not load cargo beyond the end of the T-floor.
- Do not plug channels at end of T-floor.
- Do not load cargo above the red line.
- Do not set reefer set point at a temperature below that required by the cargo (this does not expedite the cooling process).

Frozen Cargo Specifics – DO:

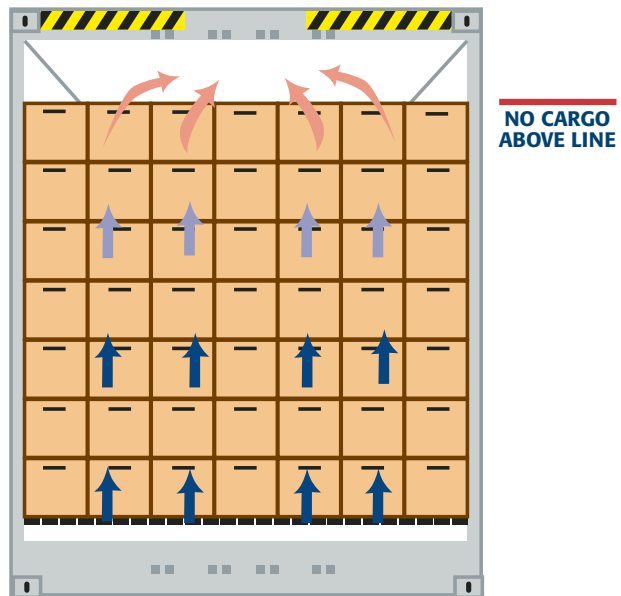
- Follow general reefer cargo check list (above).
- Prefreeze cargo before loading.
- Ensure fresh-air vent is CLOSED.

CHILLED Cargo Specifics – DO:

- Follow general reefer cargo check list (above).
- Precool cargo before loading.
- Set unit at carrying temperature, not lower (lower set point will not expedite cooling process and may damage cargo).
- Set fresh-air vent as required.

Avoid Cargo Damage – DO NOT:

- Do not leave open floor space at front bulkhead or sidewalls (if pallets are placed at front bulkhead, be sure to place cardboard under empty pallets).
- Do not run unit with rear doors open.



Diagrams courtesy of
Patrick E. Brecht,
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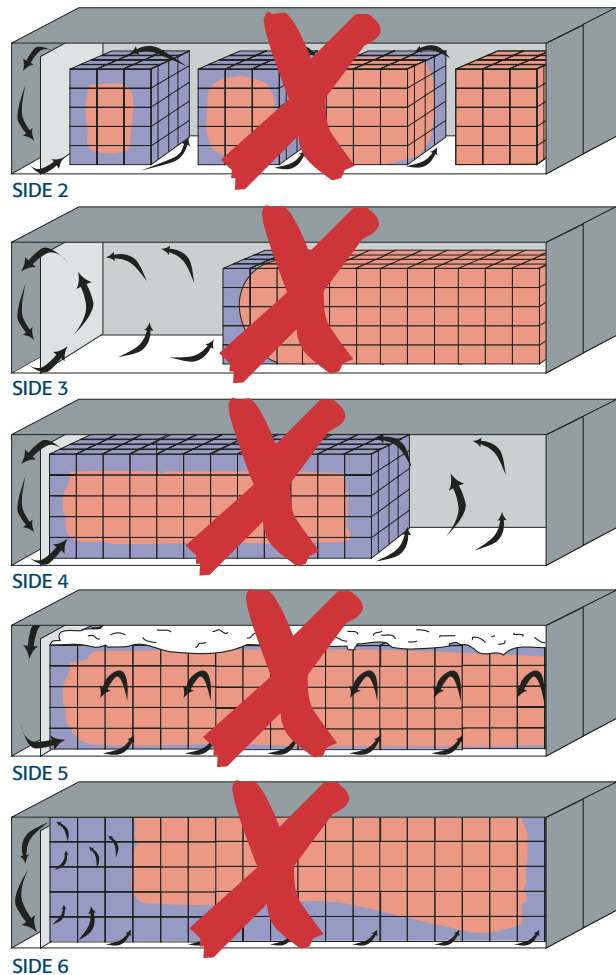
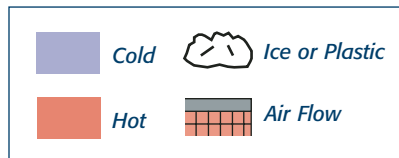
Loading a Reefer to Optimize Quality

Things "To Do"

The SIDE 1 view on page 22 illustrates the correct way to load a "bottom-air" reefer with chilled or frozen cargo. In the case of live **chilled** cargo, covering the entire floor with cargo forces the cool air to flow through the cartons and product throughout the container. When **frozen** cargo is loaded in this manner, the cold air flows around the cargo, blanketing the cartons and removing any heat that enters the reefer container through the walls.

Things "Not To Do"

Air always takes the path of least resistance. To the right are five examples that illustrate improperly loaded reefer cargo. In three of these cases (SIDE 2-4) air tends to "short circuit" or flow past the cartons/product rather than through them. SIDE 5 and 6 illustrate restricted air flow scenarios.

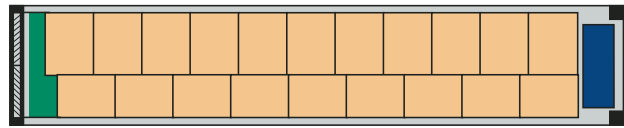


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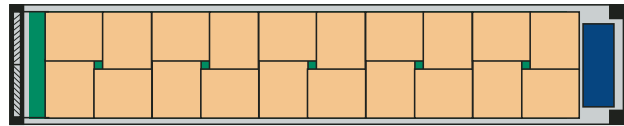
Loading a Reefer to Optimize Quality

Optimal Loading — Top View

In order to force air up and through the cargo, the entire floor should be covered. Cover the floor from the front bulkhead to the end of the T-floor. Where the cargo does not cover the floor, some type of filler (dunnage, cardboard, etc.) should be used. Do not load past the end of the T-floor with cargo or filler.



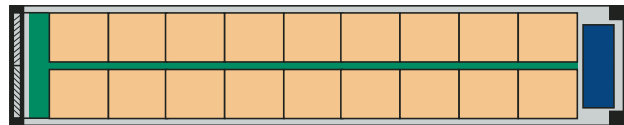
TOP 1



TOP 2



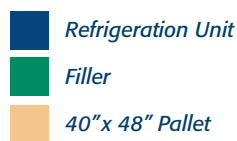
TOP 3



TOP 4



TOP 5



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Loading a Reefer to Optimize Quality

Blocking and Bracing

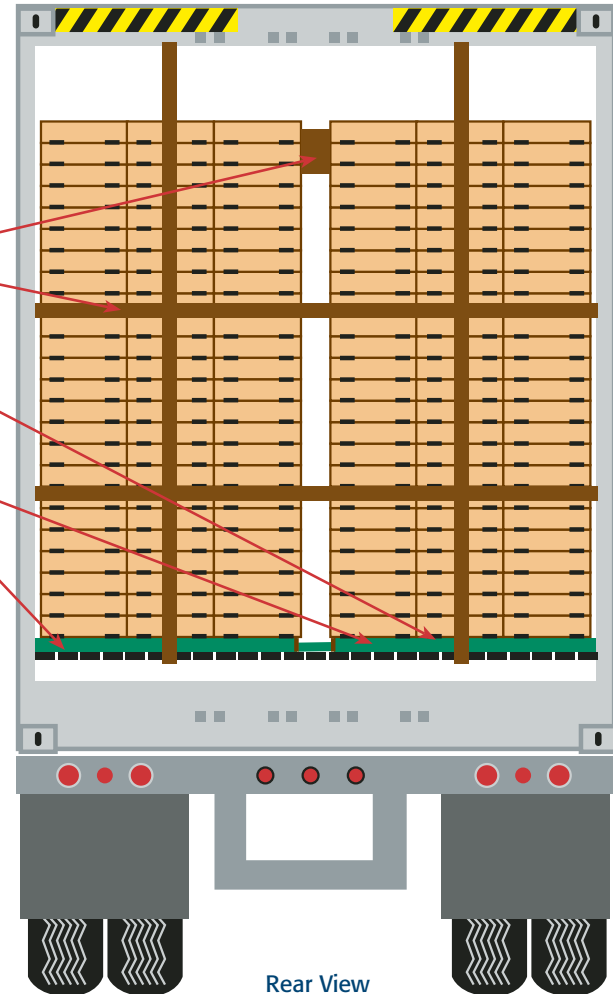
Block and brace cargo as necessary using wood. Do not nail dunnage or wood to the container.

Cover floor between pallets to help force air through cargo (as seen in the top view TOP 4 on page 24).

Cover the ends of the last two pallets in order to force air up and through the cartons. Do not block off airflow past the end of the T-floor.

 Filler (dunnage or cardboard)

 Wood Bracing



*Diagrams courtesy of
Patrick E. Brecht,
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