

# KEEP IT COOL!

## BEST PRACTICES FOR REFRIGERATED CARGO

Below are some **tricks of the trade** when dealing with refrigerated products:

- Does the trailer need to be pre-chilled?  
A reefer unit only maintains temperature; it's not designed to lower the temperature. If you put refrigerated product in a reefer trailer with an ambient temperature of 90 degrees, you're going to have a problem.
- Record the temperature of the product on the shipping documents at time of receipt
- Know the susceptibility of the product to temperature damage
- Put into your rules tariff that the temperature recorder will be prima facie evidence whether or not that the temperature has been maintained

### REFRIGERATED TRAILERS

For optimum transport temperature management, refrigerated trailers need insulation, a high capacity refrigeration unit and fan, and an air delivery duct. The checklist (right) includes these and other desired features in a top-air delivery trailer.

#### Refrigerated Vehicles Pre-loading Checklist

- ☐ Refrigeration unit operating properly?
- ☐ Thermostat calibrated?
- ☐ Refrigeration air chutes and ducts properly installed and in good repair?
- ☐ Door seals in good condition?
- ☐ Doors seal tightly when closed?
- ☐ Walls free of cracks and holes?
- ☐ Front bulkhead installed?
- ☐ Floor drains open?
- ☐ Inside of vehicle clean and odor-free?
- ☐ Floor grooves free of debris?
- ☐ Inside height, width, length adequate for load?
- ☐ Load braces and other devices available to secure load?
- ☐ Is the vehicle trailer pre-cooled (or pre-warmed)?



**OLD REPUBLIC**

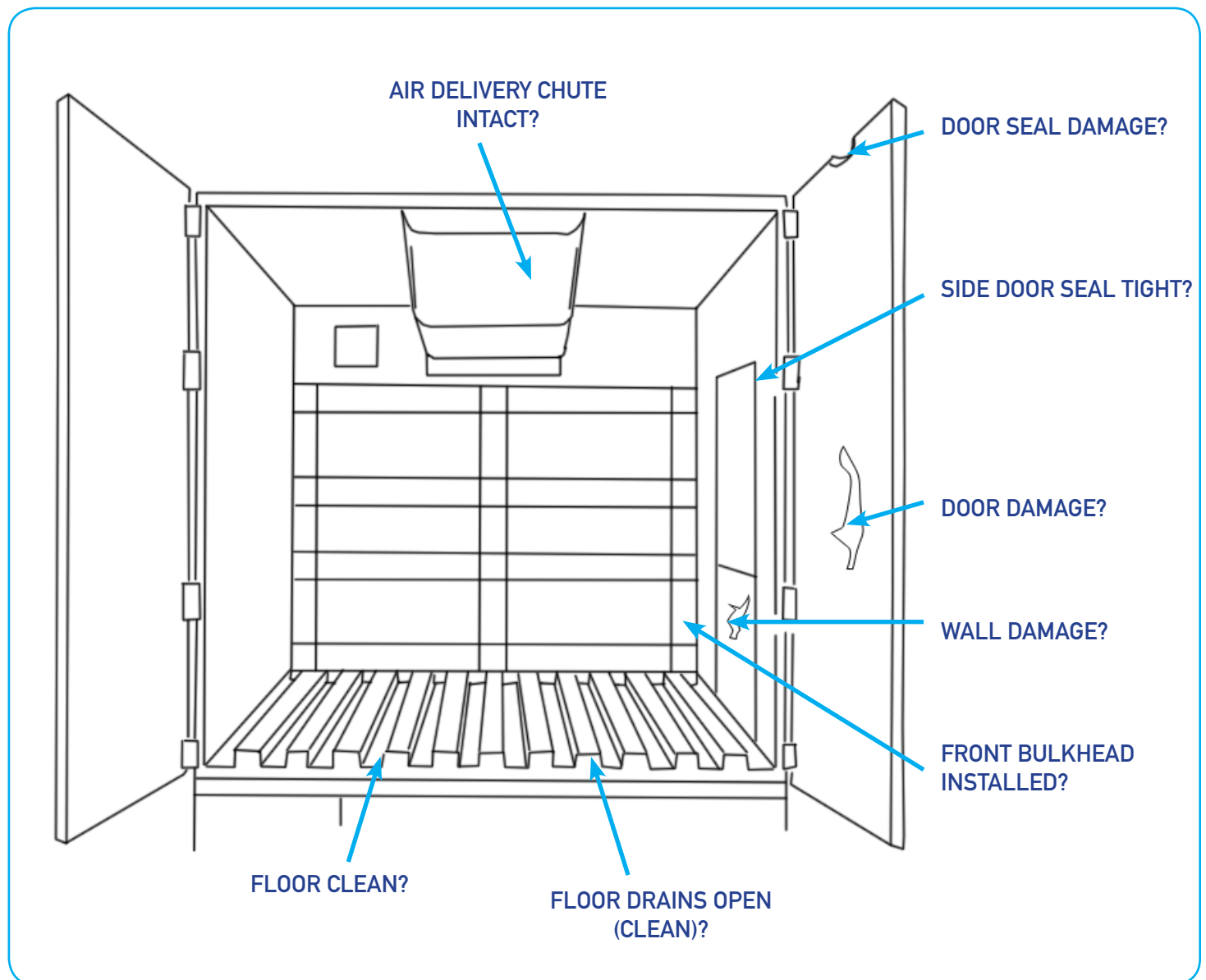
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# CONDITION OF THE REFRIGERATED TRAILER

The condition of the inside of a refrigerated trailer affects its ability to maintain desired temperatures during transport. Handlers should inspect the trailer before loading, and check these features:



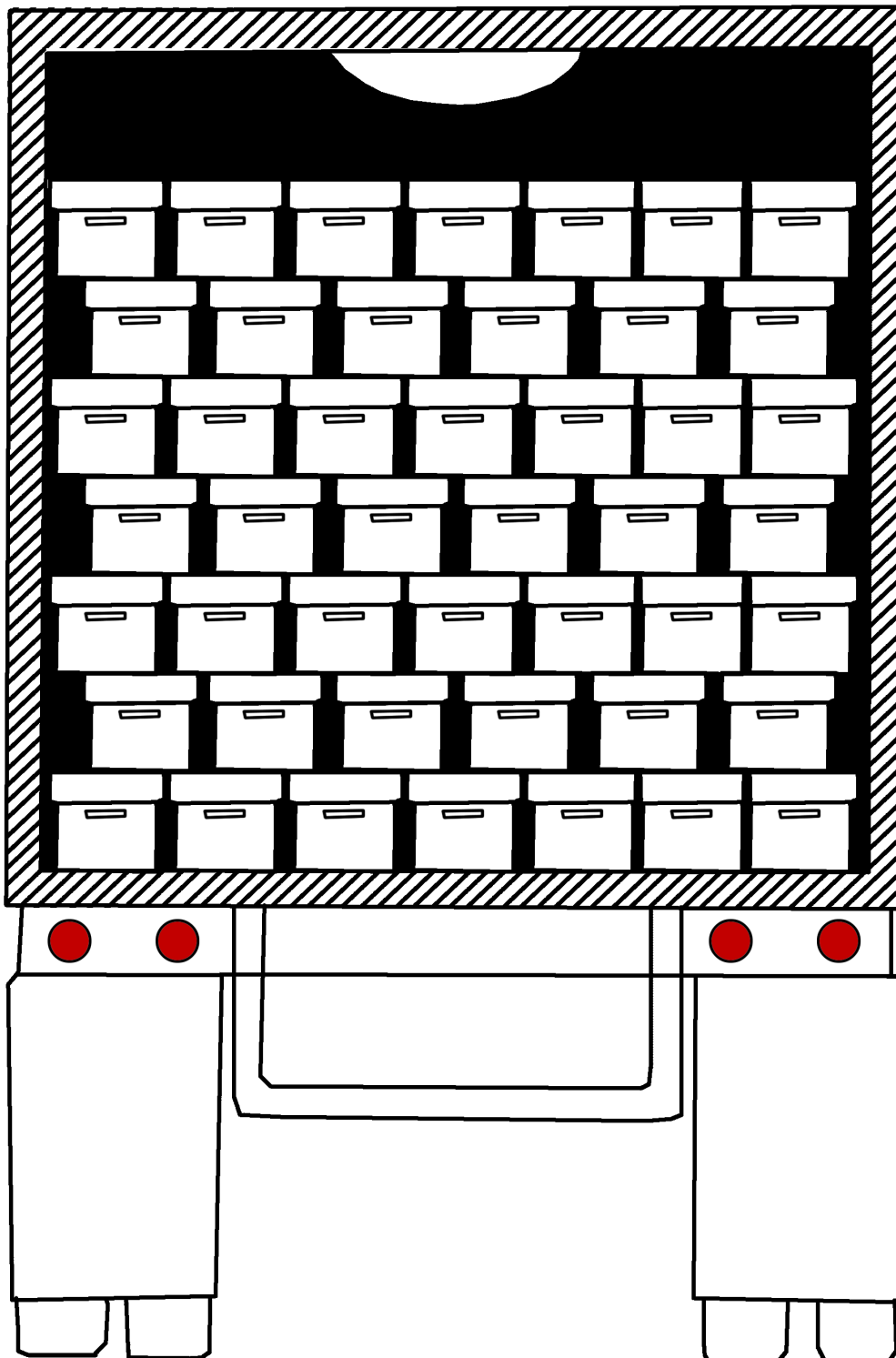
## ADDITIONAL QUESTIONS TO ANSWER BEFORE LOADING:

- Inside width adequate for load?
- Inside height adequate for load?
- Door height adequate for load?
- Load bars used to secure load?
- Trailer precooled before loading?
- Refrigeration unit operates satisfactorily?

# STACKING PATTERNS/HAND-STACKED

Produce transported in cartons should be stacked so as to allow adequate air circulation throughout the load. The diagram below illustrates cross-wise offset loading of partial

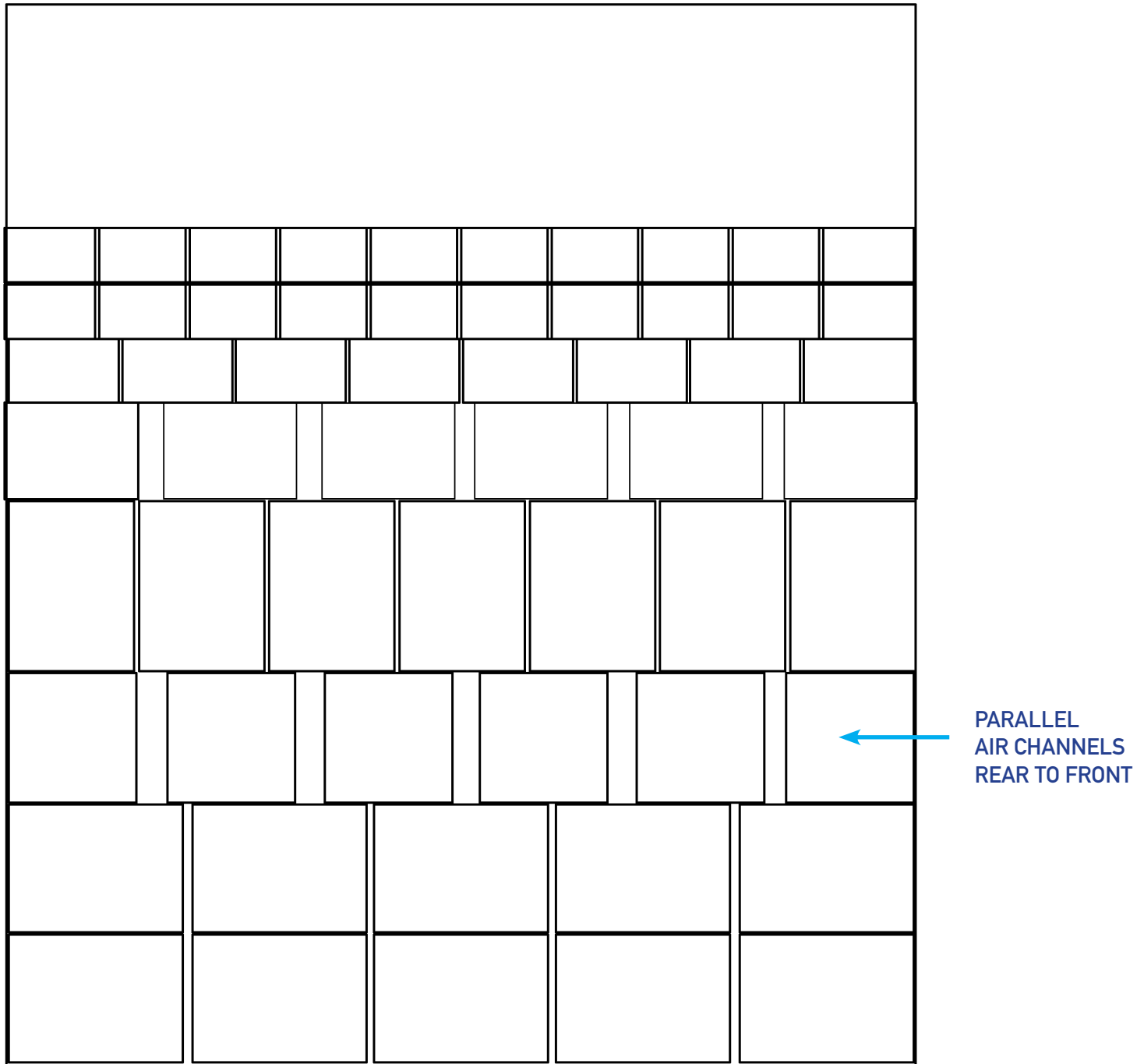
telescopic containers. On the floor of the truck, pallets or other supports should be used to keep the cartons out of direct contact with the floor.



Source: Ashby, B. H. et al. 1987.  
Protecting Perishable Foods  
During Transport by Truck.  
Washington, D.C.: USDA,  
Office of Transportation,  
Agricultural Handbook No. 669.

# USE OF PARALLEL CHANNELS

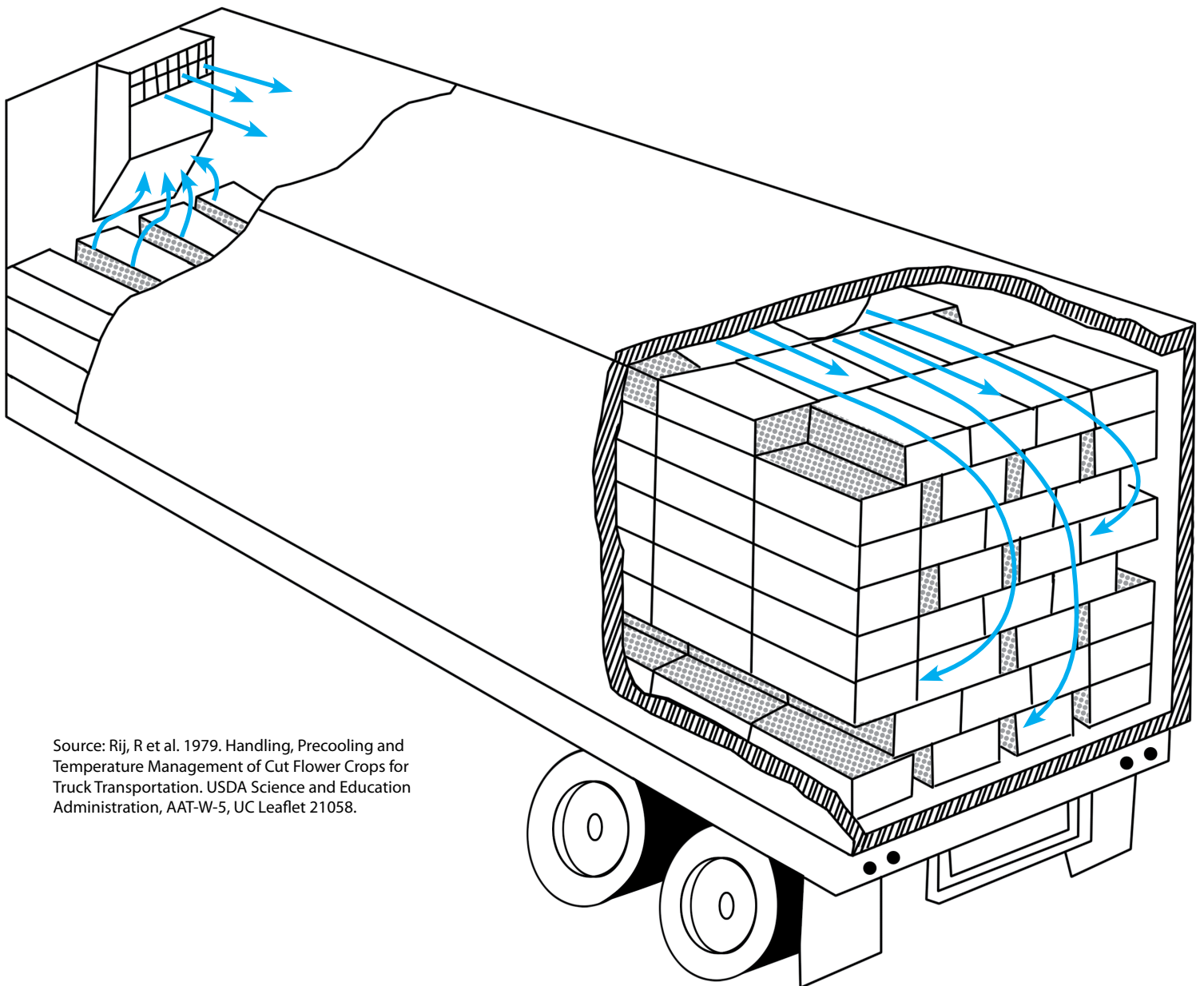
When cartons of various sizes must be loaded together, the larger, heavier containers should be placed on the bottom of the load. Parallel channels should be left for air to move through the length of the load.



Source: Nicholas, C.J. 1985. Export Handbook for U.S. Agricultural Products. USDA, Office of Transportation, Agricultural Handbook No. 593

# PIGEON HOLE PATTERN

Often the large containers used for cut flower packaging must be hand-stacked when loaded into a transport vehicle. The best loading pattern for cut flowers is known as the pigeon hole pattern, where boxes are stacked in alternating solid and open layers, and channels are left down both side walls. This pattern provides channels for air circulation lengthwise through the load, and allows every box to be in direct contact with refrigerated air.

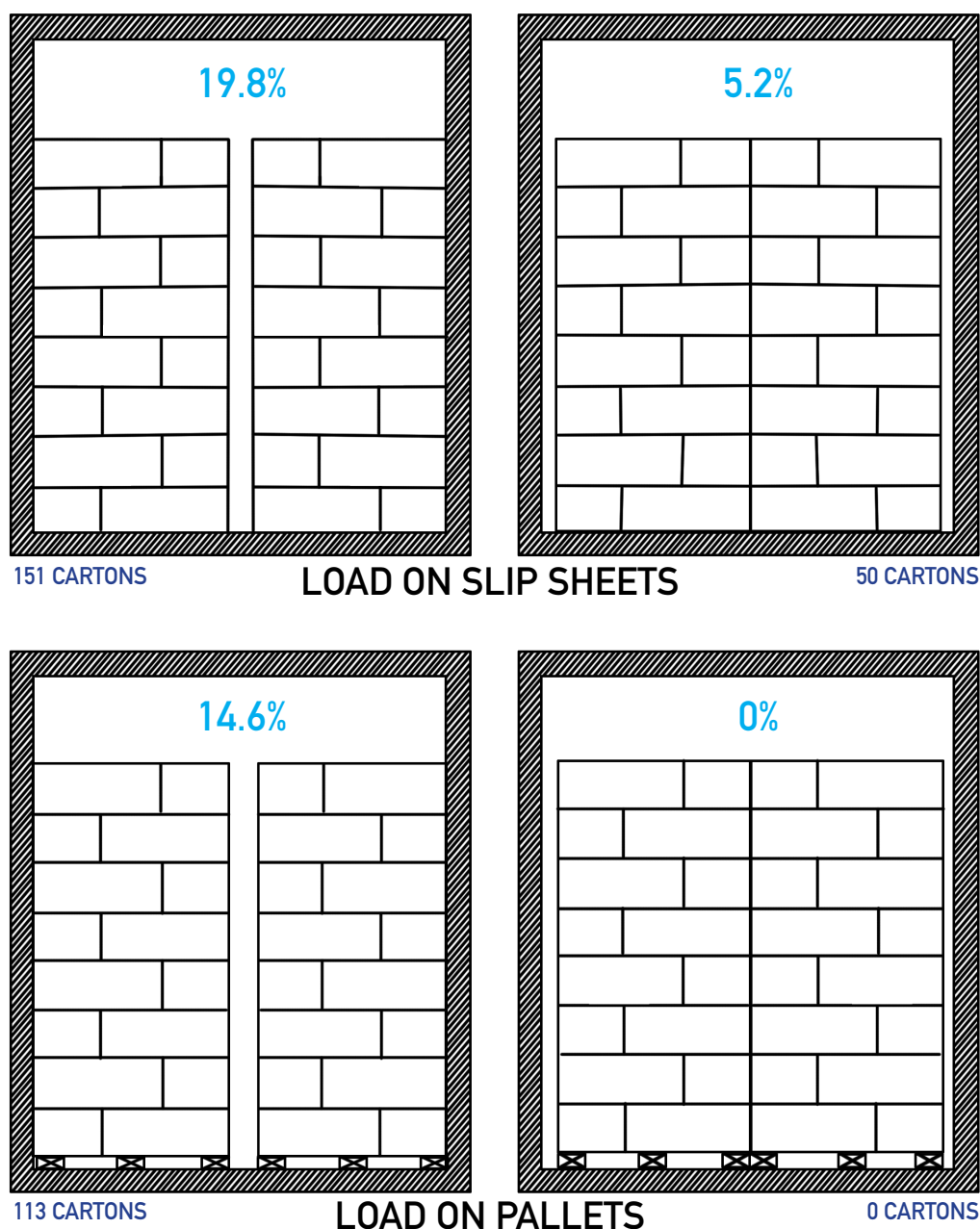


Source: Rij, R et al. 1979. Handling, Precooling and Temperature Management of Cut Flower Crops for Truck Transportation. USDA Science and Education Administration, AAT-W-5, UC Leaflet 21058.

# STACKING PATTERNS/PALLET & SLIP SHEET LOADS

Containers should be loaded so that they are away from the side walls and the floor of the transport vehicle in order to minimize the conduction of heat from the outside environment. In the diagrams below, the numbers of cartons refer to how many cartons would be in contact with the walls and floor of the truck when fully loaded.

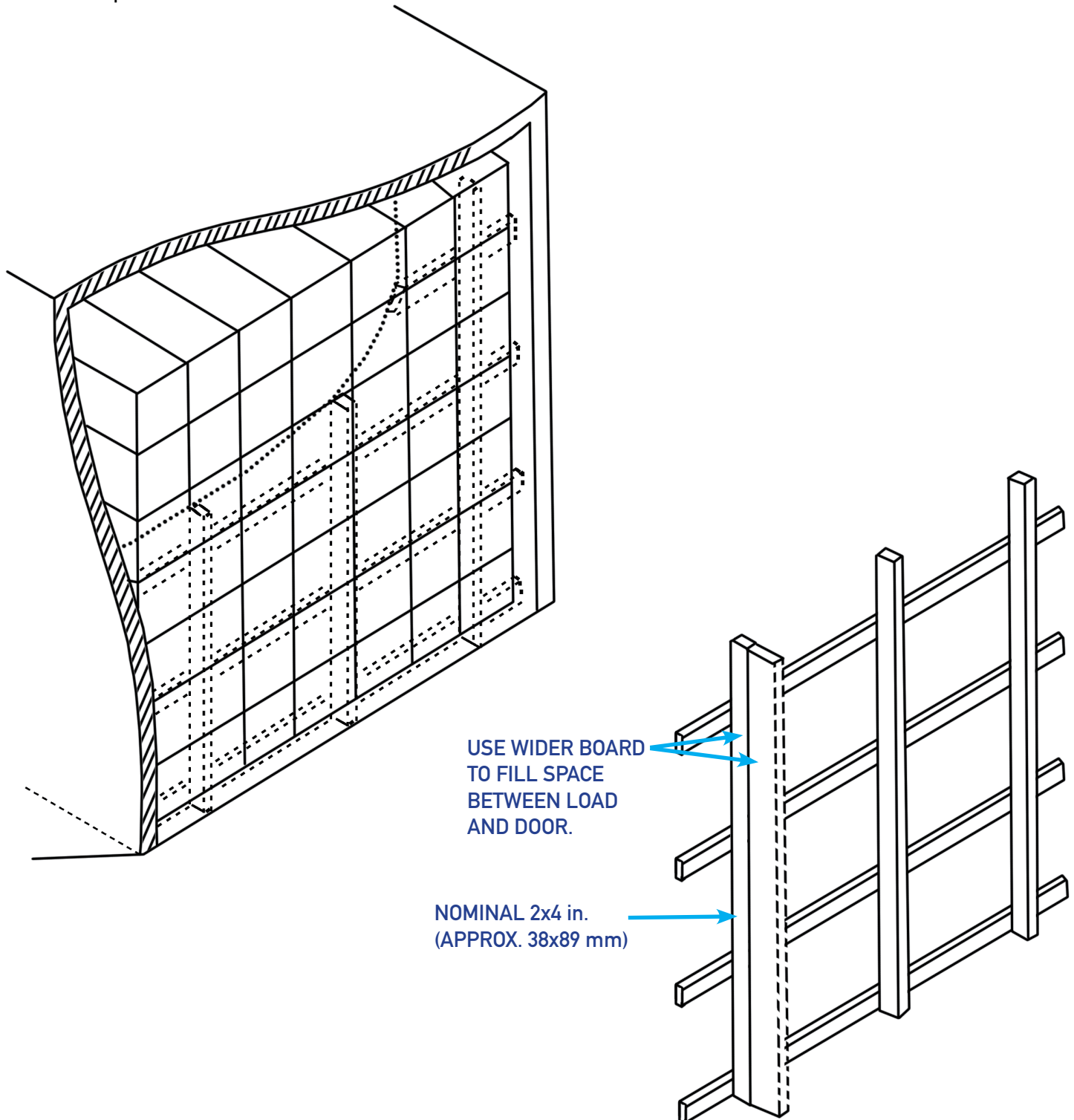
Only the load on the bottom right is fully protected from heat transfer. The use of pallets keeps the cartons off the floor, while center-loading leaves an insulating air space between the pallet loads and the outside walls.





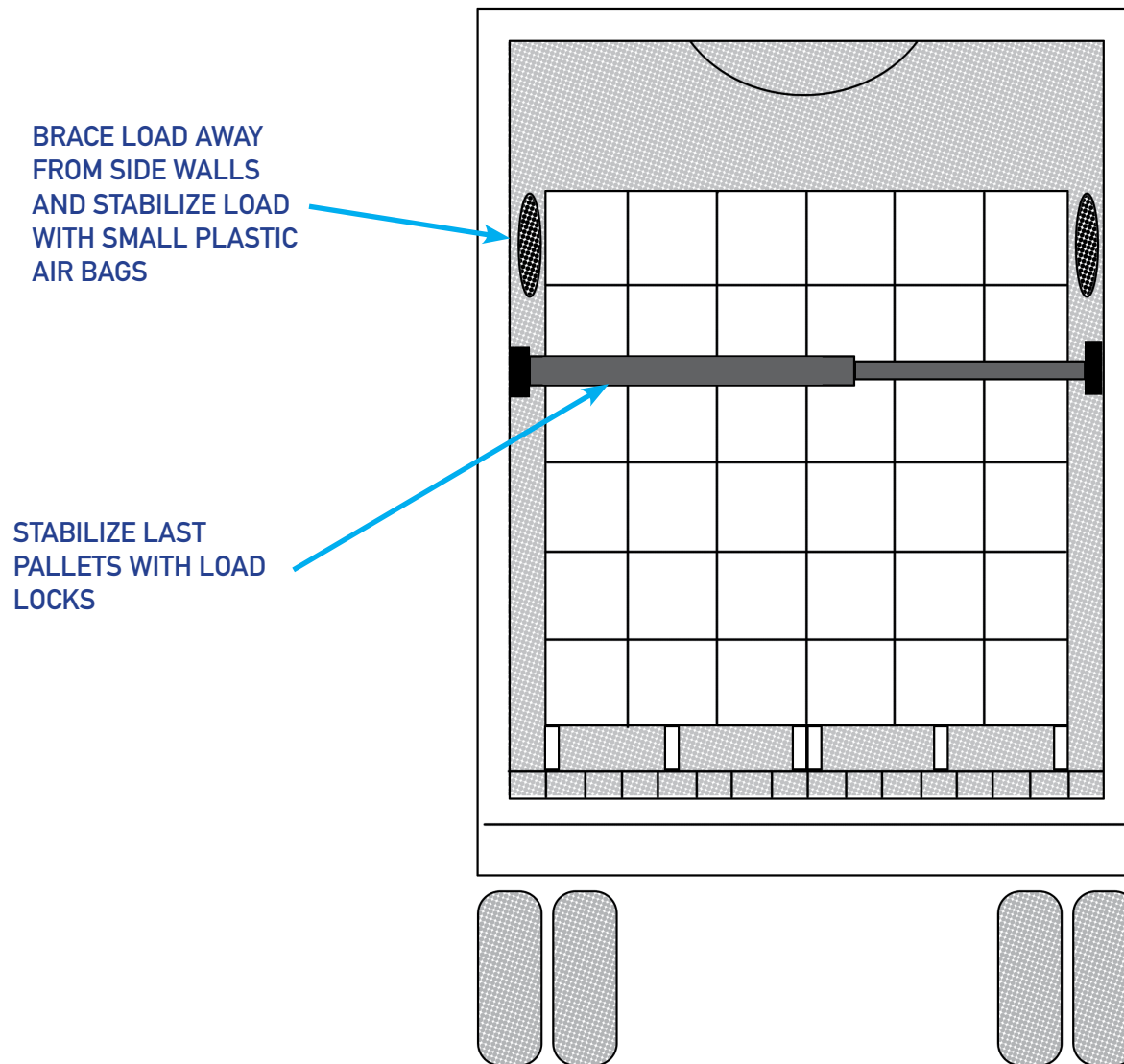
# BRACING THE LOAD

There should always be a void between the last stack of produce and the back of the transport vehicle. The load should be braced to prevent shifting against the rear door during transit. If the load shifts, it can block air circulation, and fallen cartons can present great danger to workers who open the door at a destination market. A simple wooden brace can be constructed and installed to prevent damage during transport.



# ADDITIONAL WAYS TO BRACE THE LOAD

Bracing the load can be accomplished using wooden braces, load rails, air pillows or Styrofoam blocks. The key is to immobilize stacked produce to reduce damage during transport.



Source: Thompson, J.F. 2002. Transportation. In: Kader, A.A. Postharvest Technology of Horticultural Crops (3rd Edition). UC Publication 3311. University of California, Division of Agriculture and Natural Resources. pp.259-269.

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