

INTERMODAL TEMPERATURE PROTECTION APPROVED RECOMMENDED PRACTICES

APPROVED AT THE OPERATIONS COMMITTEE MEETING
HELD IN HOUSTON, TEXAS ON SEPTEMBER 18, 2016

PALLET ADDENDUM APPROVED BY OPERATIONS COMMITTEE VIA ELECTRONIC VOTE
HELD FEBRUARY 24, 2017 THROUGH MARCH 11, 2017



Purpose of the Task Force

Develop and share with IANA members and industry professionals, industry recommended practices that help mitigate some risks associated with shipping various commodities, particularly beverages, in intermodal dry boxes during extreme temperatures.

Task Force Members

- Adam Anderson – Astro Cooler
- Kermit Arrington – Constellation Brands
- Sheri Beckler – Suntek TTS
- Kirk Bockelman – J.B. Hunt
- Ward Chaplin – Southern Glaziers Wine & Spirits
- Brad Cozart – Coca-Cola
- Will Davis – MillerCoors
- Justin Garcia – Protek Cargo
- Dave Hammond – QPI Products
- Gary Jashinsky – Schneider
- Peter Mirabella – Q Products & Service
- Craig Nixon – Norfolk Southern
- Scott Parke – Protek Cargo
- Jeff Poeppe – Union Pacific

Task Force Leader: Jeff Brashares – Suntek TTS



Recommended Practice #1:

“Get away from the wall!”

- Product loaded against a trailer or container wall will be the same temperature as outside the trailer within 24 hours. Conduction (the transfer of heat or cold from one object to another) can wreak havoc on temperature sensitive cargo.
- Center loading of freight away from the walls is strongly recommended to eliminate the impact of temperature — and the further away from the walls, the less the chance of conduction.
 - 1” = 15% heat/cold transfer
 - 2” = 10% heat/cold transfer
 - 4” = <5% heat/cold transfer

Recommended Practice #1: (cont.)

“Get away from the wall!”

- Product is loaded tight against the walls in intermodal to prevent load shifts. AAR Intermodal Loading Guide allows for voids between sidewalls and shippers' product with appropriate dunnage and any additionally approved measures necessary to safely secure product.
- Creating a void for insulating purposes is important. 4-6 inches between the sidewall and shippers' products during extreme weather conditions is recommended.
- A variety of options are on the market, from airbags to foil backed fillers, Styrofoam panels and folding fillers.
- Loading engineers can help shippers create a loading pattern that will protect product from damage, temperature and keep product moving via the rails safe. Some shippers maintain two loading patterns, one for times or destinations that do not require temperature protection and one for when it is needed.



Recommended Practice #2:

“Get product off the floor!”

- Conduction doesn't just happen against the sidewall, it also comes through the floor
- The solution is simple:
 - Ensure that pallets are used to create a barrier between your products and the floor

Recommended Practice #3:

“Use Blankets to create a protective barrier”

- By placing a blanket over the top of the cargo starting from the nose of the container all the way down to the rear floor of the container, traps the cargo's temperature slowing down heat loss or heat gain.
- Product against a wall limits effectiveness but not totally:
 - During hot months, blankets are still effective in reflecting heat accumulated above the blanket back up and away from the payload.
 - During cold months, blankets effectively capture the heat of product not allowing it to emanate up and out of the container.
- For maximum protection, it is suggested to insulate the entire load including all walls.

Recommended Practice #4:

“Raise or lower the temperature at loading”

- Blankets slow the transfer of temperature but timing is everything.
- Capturing warm temperatures in the winter and cool temperatures in summer means your product will be protected longer and have more time before exceeding your temperature threshold.
- Those that have used an engine heater will understand this concept.
- Plugging in a block heater of a cold engine has no impact.
- Plugging in an engine heater as soon as a warm engine has been turned off maintains the temperature of the engine so that it will quickly start even in frigid temperatures.
- By starting at the desired temperature you have made the blanket more effective and given your product more time before it will exceed its maximum threshold.



Recommended Practice #5:

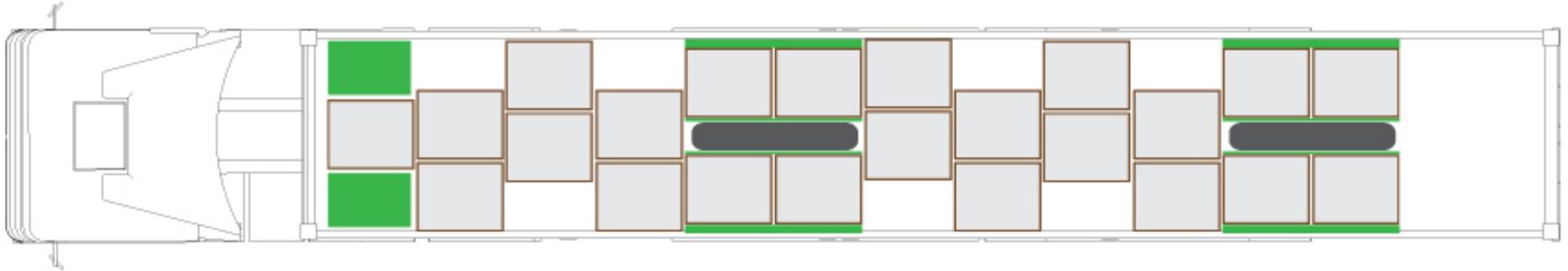
“Monitor the weather”

Monitoring the weather is complicated:

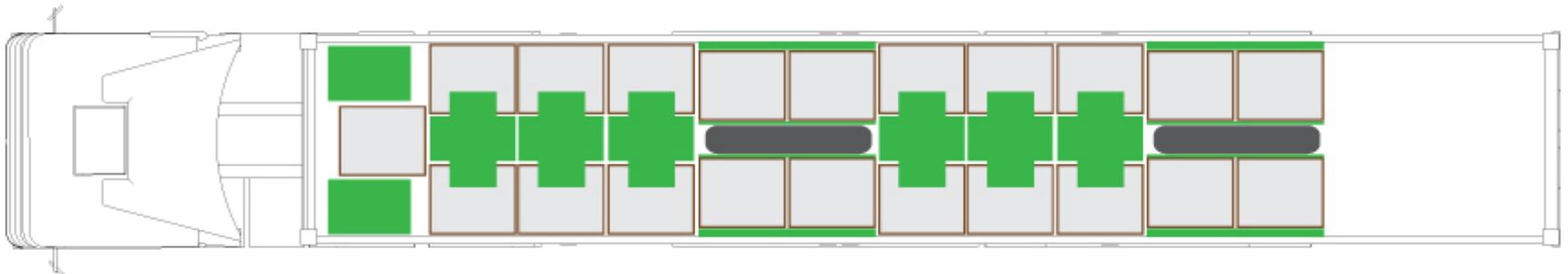
- Not only do you need to monitor temperature and conditions at your points of origin and destination, you need to include all of the points in between.
- Doing so needs to be an additional task on your daily to-do list and can be done manually via the internet or by using a service which monitors the temperature throughout the planned transit.

Typical Loading Patterns: Non Ideal

Cased Goods – Wine in 2-2 Offset Pattern Secured with DID Airbags

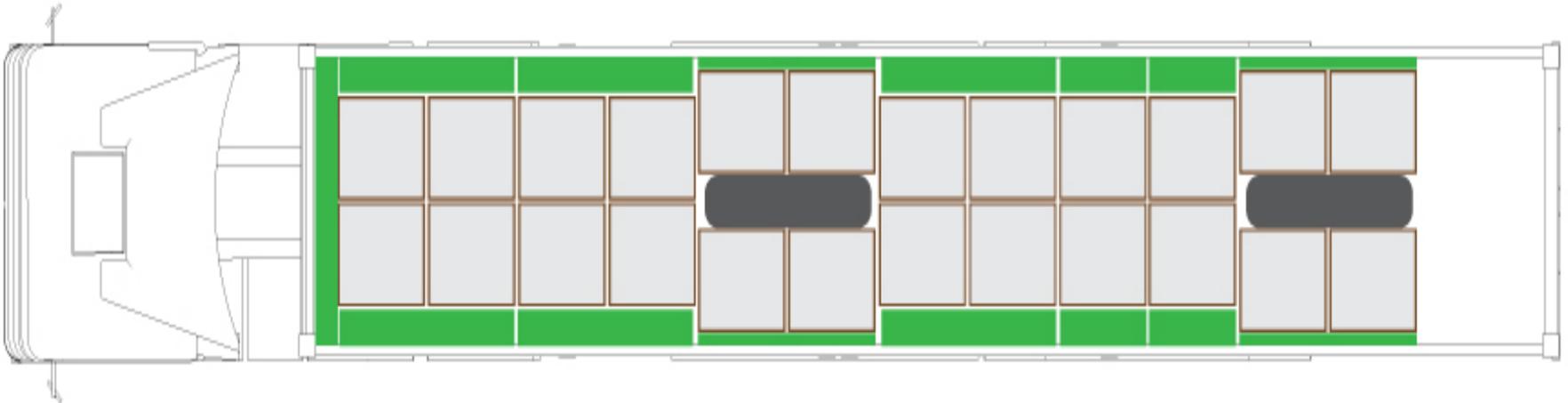


Cased Goods – Wine Against the Wall Secured with DID Airbags & Drop Fillers

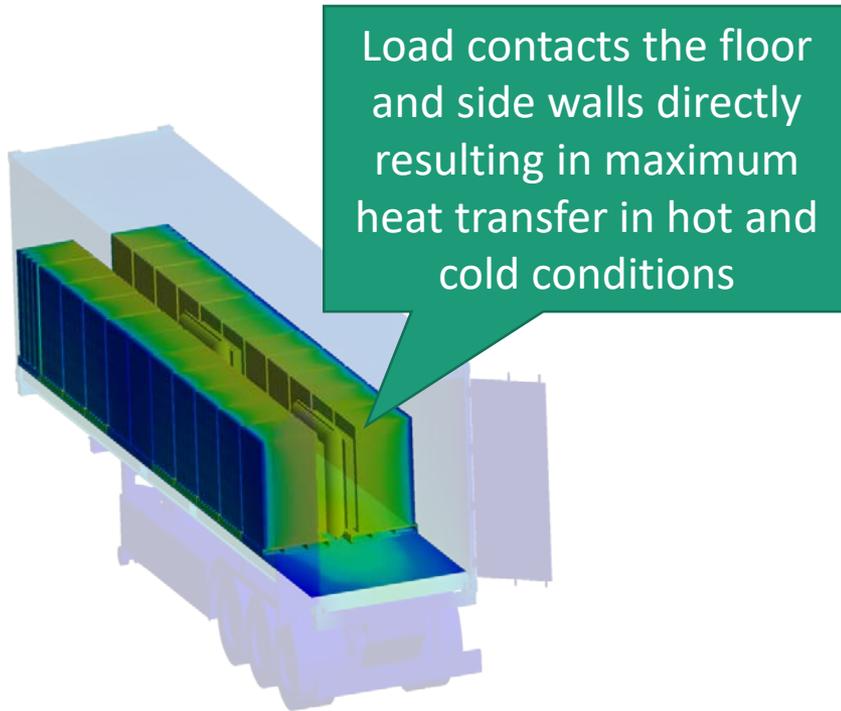


Recommended Loading Pattern Greatly Enhances Load Temperature Control

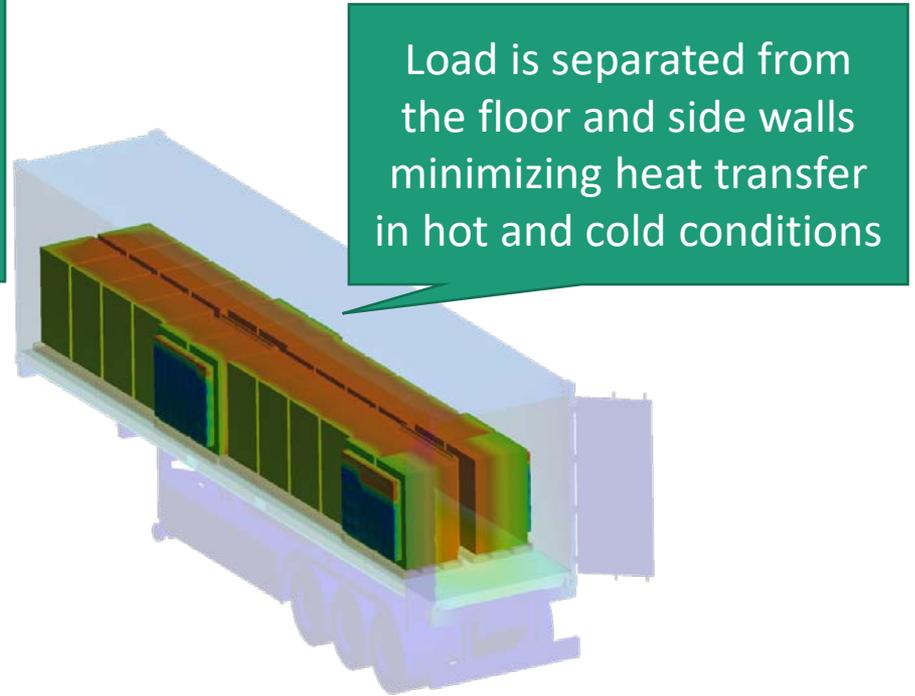
Reduce wall contact by 90% over traditional methods



Thermal Image of a Trailer at 15° F



Product locked against wall produces
Internal temp of 22° F



Cargo center loaded produced
Internal temp of 42° F

Best Example

(Minimizes conduction, radiation, and convection heat transfer)



Reflective blanket reduces radiation heat transfer and traps an air layer to minimize convection heat transfer

Insulation, dunnage or pallet spacing is necessary to separate the product from the side wall

Blanket is laid tight to side walls of the trailer

Pallet loaded, separated from the floor of the trailer (also see [Pallet Addendum](#))

Wall Protection Example

(Maximize side wall seal and minimize convection heat transfer effect)



Convective flow
channeled up &
away from payload

Sidewall Seal

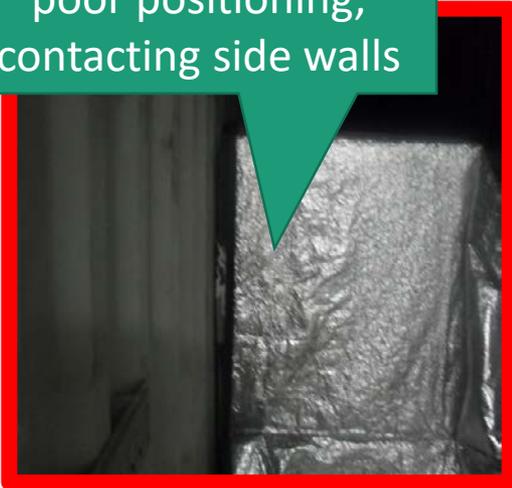
Corrugate wall
panels

Reflective Wall
Wrap



Improper Cargo Placement

Good use of blanket,
poor positioning,
contacting side walls



Poor positioning,
contacting side walls



4-6" separation from
side walls minimizing
heat transfer



Good use of reflective
blankets

Dunnage



Use of dunnage



Proper Cargo Placement

Conclusions

- Tests were conducted during winter and summer conditions.
- It was determined that proper placement of cargo is a critical factor in preventing loss in maintaining product integrity.
- Correct storage of cargo should not touch the side or front of the container.

Conclusions (cont.)

- When placing the first two pallets or slip sheets, ensure that either the blanket is folded over the cargo between the front wall and the goods.
- In extreme weather conditions, some form of wall insulation such as dunnage or insulation panels (foam, fiber or bubble) should be placed between the goods and the container wall.
- Product placement should allow 4-6 inches between the wall of the container.
- Air bags, corrugated void fillers and dunnage must be used in accordance with Association of American Railroads (AAR) best practices and insurance requirements.



Recommended Practices

To mitigate some risks associated with shipping various commodities, particularly beverages, in intermodal dry boxes during extreme temperatures, shippers and transport companies should:

- Move product away from the container walls.
- Use dunnage between the product and container walls.
- Move product off the container floor (e.g. use of pallets).
- Use a Loading Engineer if necessary.
- Cover payload from nose to rear, down to floor with blanket.
- Ensure proper temperature at loading.
- Monitor weather throughout shipment transit.

Pallet Addendum

The use of pallets for floor protection is an enhancement and not required. Seasonality and other factors may impact on their use.

- During Winter pallets are recommended and add value to load protection.
- During Summer months slip sheets can replace the use of pallets.
- During Spring and Fall the use of pallets or slip sheets is optional.

What's important is that year round movements can endure multiple climate changes throughout its journey from origin and destination. The weather index inside the container is critical.

Appendix

Special Thanks & Credits to

- Kermit Arrington – Constellation Brands
- Jake Killgore – Miller/Coors
- Ward Chaplin – Southern Glazers Wine & Spirits
- Astro Cooler
- Protek Cargo
- QPI Products
- Schneider

and

- Rick Anderson, Valley Oaks Enterprises (formerly Constellation Brands)

Task Force Recommendations

- These Recommended Practices were approved by the Task Force on **September 7, 2016**.
- The Task Force recommends that the Operations Committee approve and adopt these Recommended Practices to establish methods for the shipping and intermodal community to utilize standard intermodal dry containers to help provide enhanced temperature protection in extreme weather conditions.
- The Operations Committee approved the Task Force Recommendations on **September 18, 2016**.
- The Operations Committee approved the Pallet Addendum via electronic vote conducted **February 24, 2017 through March 11, 2017**.
- The Recommended Practices will be posted on the IANA website at www.intermodal.org.