body having a top wall, a bottom wall, a front wall, a rear wall and oppositely disposed side walls, wherein the container body defines a cargo space within the container, and a passive temperature control system located within the cargo space. The passive temperature control system comprising: a plurality of insulation panels, wherein each of the plurality of insulation panels is connected to an inner surface of a corresponding wall of the container body, wherein the plurality of insulation panels are exposed to the cargo space within the container, a rack having a top rack disposed proximate the top wall , a first side rack disposed proximate a first one of the oppositely disposed side walls, and a second side rack disposed proximate a second one of the oppositely disposed side walls, wherein the top rack, the first side rack and the second side rack are connected to each other to form a unitary structure that is inserted into the cargo space within the container, and wherein the top rack, the first side rack and the second side rack each include a plurality of tracks that are parallel to each other with each pair of adjacent tracks defining a slot therebetween, and a plurality of slats connecting the tracks to maintain a spacing between the adjacent tracks, and a plurality of refrigerant bottles filled with a thermal medium, wherein the plurality of refrigerant bottles and the thermal medium are one of cooled and heated to a predetermined temperature for the cargo being shipped in the container and inserted into the slots of the rack to passively maintain a cargo space temperature in the cargo space during the shipment of the cargo.

[0007] According to a second aspect of the present invention, there is provided a container suitable for use in a shipment of a cargo by air, the container comprising a container body having a top wall, a bottom wall, a front wall, a rear wall and oppositely disposed side walls, wherein the container body defines a cargo space within the container, and wherein the container body is fabricated as a structure that is a compliant unit load device (ULD) container meeting specified aviation authority structural requirements; and a passive temperature control system located within the cargo space, the passive temperature control system comprising: a plurality of insulation panels each connected to an inner surface of a

corresponding wall of the container body wherein the plurality of insulation panels are exposed to the cargo space within the container, a rack having a top rack disposed proximate the top wall , a first side rack disposed proximate a first one of the oppositely disposed side walls, and a second side rack disposed proximate a second one of the oppositely disposed side walls, wherein the top rack, the first side rack and the second side rack are connected to each other to form a unitary structure that is inserted into the cargo space within the container, and a plurality of refrigerant bottles filled with a thermal medium and received by slots of the top rack, the first side rack and the second side rack to passively maintain a cargo space temperature in the cargo space during the shipment of the cargo. The top rack, the first side rack and the second side rack each include a plurality of tracks that are parallel to each other with each pair of adjacent tracks defining a slot therebetween, and a plurality of slats connecting the tracks to maintain a spacing between the adjacent tracks.

[0008] According to a third aspect of the present invention, there is provided a refrigerant bottle for a container suitable for use in a shipment of a cargo by air, wherein the container has an inner insulation layer and a rack proximate an insulation panel of the inner insulation layer and defining at least one slot, the refrigerant bottle comprising: a reservoir body that is sized to be inserted into the at least one

Claims

What is claimed is:

1. A container suitable for use in a shipment of a cargo by air, the container comprising:

a container body having a top wall, a bottom wall, a front wall, a rear wall and oppositely disposed side walls, wherein the container body defines a cargo space within the container, and

a passive temperature control system located within the cargo space , the passive temperature control system comprising:

a plurality of insulation panels, wherein each of the plurality of insulation panels is connected to an inner surface of a corresponding wall of the container body, wherein the plurality of insulation panels are exposed to the cargo space within the container,

a rack having a top rack disposed proximate the top wall, a first side rack disposed proximate a first one of the oppositely disposed side walls, and a second side rack disposed proximate a second one of the oppositely disposed side walls, wherein the top rack, the first side rack and the second side rack are connected to each other to form a unitary structure that is inserted into the cargo space within the container , and wherein the top rack , the first side rack and the second side rack each include a plurality of tracks that are parallel to each other with each pair of adjacent tracks defining a slot therebetween, and a plurality of slats connecting the tracks to maintain a spacing between the adjacent tracks, and

a plurality of refrigerant bottles filled with a thermal medium, wherein the plurality of refrigerant bottles and the thermal medium are one of cooled and heated to a predetermined temperature for the cargo being shipped in the container and inserted into the slots of the rack to passively maintain a cargo space temperature in the cargo space during the shipment of the cargo.

2. The container of claim 1, wherein the container body is fabricated as a structure that is a compliant unit load device (ULD) container meeting specified aviation authority structural requirements.

3. The container of claim 1, wherein the container body comprises:

a pallet forming the bottom wall;

an outer enclosure forming the top wall, the rear wall and the oppositely disposed side walls, wherein the outer enclosure is mounted on the pallet; and

a door forming the front wall, wherein the door is connected to one of the oppositely disposed side walls and rotatable between an open position and a closed position.

4. The container of claim 1, comprising a telemetry system for transmitting data in real time to a remote processor.

5. The container of claim 1, comprising a baseplate having an upper metal sheet, a lower metal sheet and an internal core fabricated from a thermoplastic polymer and disposed between the upper metal sheet and the lower metal sheet, wherein the baseplate is disposed on top of a bottom insulation panel.

6. The container of claim 5, wherein the thermoplastic polymer of the internal core is high density polyethylene (HDPE).

7. The container of claim 1, comprising a bottom insulation panel disposed on top of the bottom wall and having a plurality of break holes extending therethrough, the container comprising a plurality of thermal breaks having a thermal break height that is greater than a bottom insulation panel thickness, wherein each of the plurality of thermal breaks is disposed within a corresponding one of the plurality of break holes such that each of the plurality of thermal breaks engages a top surface of the bottom wall, and extends upward beyond an upper surface of the bottom insulation panel, and wherein the rack sits on top of the

plurality of thermal breaks and is spaced above the upper surface of the bottom insulation panel so that the bottom wall and the thermal breaks support a weight of the rack and the plurality of refrigerant bottles, and the bottom insulation panel does not support the weight of the rack and the plurality of refrigerant bottles.

8. The container of claim 7, comprising a baseplate having an upper metal sheet, a lower metal sheet and an internal core fabricated from a thermoplastic polymer and disposed between the upper metal sheet and the lower metal sheet, wherein the baseplate is disposed on top of the bottom insulation panel, wherein the baseplate has a plurality of break notches defined therein with each of the plurality of break notches having a position corresponding to one of the plurality of break holes of the bottom insulation panel, and wherein each of the plurality of thermal breaks extends upward beyond the upper surface of the baseplate such that the baseplate does not support the weight of the rack and the plurality of refrigerant bottles.

9. The container of claim 7, wherein each of the plurality of thermal breaks comprises:

a break body;

a break foot extending downward from the break body and engaging the top surface of the bottom wall when each of the plurality of thermal breaks is disposed within a corresponding one of the plurality of break holes; and

a break shoulder extending upward from the break body and extending above the bottom insulation panel and engaging the rack when each of the plurality of thermal breaks is disposed within the corresponding one of the plurality of break holes.

10. The container of claim 1, wherein, for each of the top rack, the first side rack and the second side rack, a portion of the plurality of slats is disposed on and connected to each side of the plurality of tracks, and wherein, for each of the top rack, the first side rack and the second side rack, the plurality of tracks comprises:

a plurality of first tracks that are perpendicular to and connected to the plurality of slats and are oriented with first track channels opening in a first direction; and

a plurality of second tracks that are perpendicular to and connected to the plurality of slats and are oriented with second track channels opening in a second direction, wherein the plurality of first tracks and the plurality of second tracks separate the plurality of parallel slats on either side of the rack and are alternated so that each corresponding pair of a first track and a second track and corresponding portions of the plurality of slats define one of the plurality of slots of the rack.

11. The container of claim 1, wherein each of the plurality of insulation panels comprises:

a vacuum insulated panel (VIP); and

an outer covering of expanded polypropylene (EPP) foam.

12. A container suitable for use in a shipment of a cargo by air, the container comprising:

a container body having a top wall, a bottom wall, a front wall, a rear wall and oppositely disposed side walls, wherein the container body defines a cargo space within the container, and wherein the container body is fabricated as a structure that is a compliant unit load device (ULD) container meeting specified aviation authority structural requirements; and

a passive temperature control system located within the cargo space, the passive temperature control system comprising:

a plurality of insulation panels each connected to an inner surface of a corresponding wall of the container body wherein the plurality of insulation panels are exposed to the cargo space within the container,

a rack having a top rack disposed proximate the top wall, a first side rack disposed proximate a first one of the oppositely disposed side walls, and a second side rack disposed proximate a second one of the oppositely disposed side walls, wherein the top rack, the first side rack and the second

side rack are connected to each other to form a unitary structure that is inserted into the cargo space within the container, wherein the top rack, the first side rack and the second side rack each include a plurality of tracks that are parallel to each other with each pair of adjacent tracks defining a slot therebetween, and a plurality of slats connecting the tracks to maintain a spacing between the adjacent tracks, and

a plurality of refrigerant bottles filled with a thermal medium and received by slots of the top rack , the first side rack and the second side rack to passively maintain a cargo space temperature in the cargo space during the shipment of the cargo.

13. The container of claim 12, wherein the container body comprises:

a pallet forming the bottom wall;

an outer enclosure forming the top wall, the rear wall and the oppositely disposed side walls, wherein the outer enclosure is mounted on the pallet; and

a door forming the front wall, wherein the door is connected to one of the oppositely disposed side walls and rotatable between an open position and a closed position.

14. The container of claim 12, comprising a telemetry system for transmitting data in real time to a remote processor.

15. The container of claim 12, comprising a bottom insulation panel disposed on top of the bottom wall and having a plurality of break holes extending therethrough, the container comprising a plurality of thermal breaks having a thermal break height that is greater than a bottom insulation panel thickness, wherein each of the plurality of thermal breaks is disposed within a corresponding one of the plurality of break holes such that each of the plurality of thermal breaks engages a top surface of the bottom wall and extends upward beyond an upper surface of the bottom insulation panel, and wherein the first side rack and the second side rack sit on top of the plurality of thermal breaks and are spaced above the upper surface of the bottom insulation panel so that the bottom wall and the thermal breaks support a weight of the rack and the plurality of refrigerant bottles and the bottom insulation panel does not support the weight of the rack and the plurality of refrigerant bottles.