CLAIMS

1. A refrigerated transport system comprising:

a body (22) enclosing a refrigerated compartment and comprising:

a pair of side walls (22C, 22D);

a top (22A);

a bottom (22B); and

one or more doors (28A, 28B); and

a refrigeration system (29) comprising:

a first vapor compression loop (30A) having:

a refrigerant charge;

a compressor (36A) for driving the refrigerant of the refrigerant charge;

a first heat exchanger (38A) positioned to reject heat to an external environment in a cooling mode; and

a second heat exchanger (42A) positioned to absorb heat from the refrigerated compartment in the cooling mode; and

a second vapor compression loop (30B) having:

a refrigerant charge;

a compressor (36B) for driving the refrigerant of the refrigerant charge;

a first heat exchanger (38B) positioned to reject heat to an external environment in a cooling mode;

a second heat exchanger (42B) positioned to absorb heat from the refrigerated compartment in the cooling mode; and

for each of the first vapor compression loop and the second vapor compression loop:

an electric fan (52A, 52B) positioned to drive a recirculating air flow from the refrigerated compartment across the second heat exchanger,

wherein the recirculating air flow of the respective fans are in parallel, and

wherein:

the one or more doors are at a first end of the body; and

the refrigeration system is mounted in an equipment box at a second end

of the body opposite the first end.

2. The refrigerated transport system of claim 1 wherein for each of the first vapor compression loop and the second vapor compression loop:

the refrigerant charge of the vapor compression loop is mildly flammable.

3. The refrigerated transport system of claim 1 wherein for each of the first vapor compression loop and the second vapor compression loop:

the refrigerant charge of the vapor compression loop comprises at least 50% by weight one or a combination of R-1234ze(E), R-32, R-1234yf.

4. The refrigerated transport system of claim 1 wherein for each of the first vapor compression loop and the second vapor compression loop:

the refrigerant charge of the vapor compression loop comprises at least 30% by weight one of R-1234ze(E), R-32, R-1234yf.

5. The refrigerated transport system of claim 1 wherein for each of the first vapor compression loop and the second vapor compression loop:

the refrigerant charge of the vapor compression loop comprises at least 50% by weight one of R-1234ze(E), R-32, R-1234yf.

6. The refrigerated transport system of claim 1 wherein for each of the first vapor compression loop and the second vapor compression loop:

the refrigerant charge has a mass of not more than 2.0 kg.

7. The refrigerated transport system of claim 1 wherein:

the first vapor compression loop and the second vapor compression loop are not in refrigerant communication with each other.

8. The refrigerated transport system of claim 1 further comprising:

a single generator (60) powering the compressor of the first vapor compression loop and the compressor of the second vapor compression loop.

9. The refrigerated transport system of claim 1 further comprising:
a detector (232) for detecting leakage of the refrigerant.

10. The refrigerated transport system of claim 9 further comprising:
a locking mechanism (230; 300) having a first condition locking the doors and a second condition allowing opening of the doors and coupled to the detector.

11. The refrigerated transport system of claim 10 wherein:
the locking mechanism is coupled to the detector to shift from the second condition to the first condition responsive to detection by the detector of the refrigerant outside the refrigerant flowpaths.

12. The refrigerated transport system of claim 9 further comprising one or both of:
an externally visible light (262) coupled to the detector; and
an externally audible alarm (264) coupled to the detector.

13. The refrigerated transport system of claim 9 further comprising:
a battery-powered ventilation fan.

14. The refrigerated transport system of claim 9 further comprising an additional electric fan (50A, 50B), whereby for each of the first vapor compression loop and the second vapor compression loop:
the additional electric fan (50A, 50B) is positioned to drive an air flow across the first heat exchanger.

15. The refrigerated transport system of claim 9 wherein:
the detector comprises a non-dispersive infrared sensor.

16. The refrigerated transport system of claim 9 being a refrigerated intermodal shipping container wherein:

the one or more doors comprise a pair of hinged doors at a first end of the body; and

the refrigeration system is mounted in an equipment box at a second end of the body opposite the first end.

17. The refrigerated transport system of claim 9 further comprising:

a controller coupled to the detector so as to, responsive to said detecting leakage of the refrigerant, at least one of:

vent the refrigerated compartment;

lock at least one door of the one or more doors;

isolate a portion of the refrigeration flowpath; and

provide an audible and/or visible indication of the detection.

18. A method of operating a refrigerated transport system comprising:

a body (22) enclosing a refrigerated compartment and comprising:

a pair of side walls (22C, 22D);

a top (22A);

a bottom (22B); and

one or more doors (28A, 28B); and

a refrigeration system (29) comprising:

a first vapor compression loop (30A) having:

a refrigerant charge;

a compressor (36A) for driving the refrigerant of the refrigerant charge;

a first heat exchanger (38A) positioned to reject heat to an external environment in a cooling mode; and

a second heat exchanger (42A) positioned to absorb heat from the refrigerated compartment in the cooling mode; and

a second vapor compression loop (30B) having:

a refrigerant charge;

a compressor (36B) for driving the refrigerant of the refrigerant charge;

a first heat exchanger (38B) positioned to reject heat to an external environment in a cooling mode;

a second heat exchanger (42B) positioned to absorb heat from the refrigerated compartment in the cooling mode; and

for each of the first vapor compression loop and the second vapor compression loop:

an electric fan (52A, 52B) positioned to drive a recirculating air flow from the refrigerated compartment across the second heat exchanger,

wherein the recirculating air flow of the respective fans are in parallel, and

wherein:

the one or more doors are at a first end of the body; and

the refrigeration system is mounted in an equipment box at a second end of the body opposite the first end;

the method comprising:

responsive to said detecting leakage of the refrigerant, at least one of:

venting the refrigerated compartment;

locking at least one door of the one or more doors;

isolating a portion of the refrigeration flowpath; and

providing an audible and/or visible indication of the detection.