[Document Name] Claims

1. A set temperature calculating apparatus comprising:

a first obtaining unit configured to obtain data correlating with a heat load in a container storage;

a second obtaining unit configured to obtain a set temperature for performing temperature control in the container storage; and

a learning unit configured to perform machine learning to learn a cargo core temperature in the container storage according to a data set including a combination of the data correlating with the heat load and the set temperature.

2. The set temperature calculating apparatus according to claim 1, further comprising:

a changing unit configured to change the predetermined set temperature based on a difference between an inferred cargo core temperature and a target temperature of the cargo core temperature in the container storage, the inferred cargo core temperature being inferred by inputting data correlating with a heat load in the container storage and a predetermined set temperature into a result of the learning by the learning unit, and the target temperature being determined based on a low temperature treatment condition.

3. The set temperature calculating apparatus according to claim 2, wherein the data correlating with the heat load includes any of

temperature data and humidity data in the container storage, a ventilation volume in the container storage, and outside air temperature data and outside air humidity data outside the container storage.

4. The set temperature calculating apparatus according to claim 3, wherein the temperature data and the humidity data in the container storage are output by a suction temperature sensor, a discharge temperature sensor, and a humidity sensor installed on a refrigerator included by the container storage.

5. The set temperature calculating apparatus according to claim 3, wherein the temperature data in the container storage is calculated based on temperature data and pressure data output by a temperature sensor and a pressure sensor installed on an evaporator of a refrigerator included by the container storage.

6. The set temperature calculating apparatus according to claim 3, wherein the outside air temperature data and the outside air humidity data outside the container storage are output by an outside air temperature sensor and an outside air humidity sensor installed on a refrigerator included by the container storage or an outside air temperature sensor and an outside air humidity sensor installed separately from the refrigerator included by the container storage.

7. The set temperature calculating

apparatus according to claim 3, wherein the outside air temperature data outside the container storage is calculated based on temperature data and pressure data output by a temperature sensor and a pressure sensor installed on a condenser of a refrigerator included by the container storage.

8. A low temperature treatment system comprising:

the set temperature calculating apparatus according to any one of claims 2 to 7; and

a control apparatus configured to control a refrigerator included by the container storage so as to make a temperature in the container storage closer to the set temperature changed by the changing unit.

9. The low temperature treatment system according to claim 8, further comprising:

a reporting unit configured to report abnormality when the cargo core temperature in the container storage does not change, even after a predetermined time has elapsed since control was started by the control apparatus so as to make the temperature in the container storage closer to the set temperature changed by the changing unit.

10. The low temperature treatment system of claim 8, wherein the refrigerator includes a refrigerant circuit including a compressor, a condenser, an expansion mechanism, and an evaporator; a suction temperature sensor; a discharge temperature sensor; a humidity sensor; an outside air temperature

sensor; an outside air humidity sensor; and a cargo core temperature sensor.

11. A set temperature calculating method comprising:

a first obtaining step of obtaining data correlating with a heat load in a container storage;

a second obtaining step of obtaining a set temperature for performing temperature control in the container storage; and

a learning step of performing machine learning to learn a cargo core temperature in the container storage according to a data set including a combination of the data correlating with the heat load and the set temperature.

12. The set temperature calculating method according to claim 11, further comprising:

a changing step of changing the predetermined set temperature based on a difference between an inferred cargo core temperature and a target temperature of the cargo core temperature in the container storage, the inferred cargo core temperature being inferred by inputting data correlating with a heat load in the container storage and a predetermined set temperature into a result of the learning of the learning step, and the target temperature being determined based on a low temperature treatment condition.

13. A set temperature calculating program for causing a computer to execute:

a first obtaining step of obtaining data

correlating with a heat load in a container storage;

a second obtaining step of obtaining a set temperature for performing temperature control in the container storage; and

a learning step of performing machine learning to learn a cargo core temperature in the container storage according to a data set including a combination of the data correlating with the heat load and the set temperature.

14. The set temperature calculating program according to claim 13, further comprising:

a changing step of changing the predetermined set temperature based on a difference between an inferred cargo core temperature and a target temperature of the cargo core temperature in the container storage, the inferred cargo core temperature being inferred by inputting data correlating with a heat load in the container storage and a predetermined set temperature into a result of the learning of the learning step, and the target temperature being determined based on a low temperature treatment condition.