DESCRIPTION

APPARATUS EVALUATION SYSTEM AND APPARATUS EVALUATION METHOD

TECHNICAL FIELD

The present disclosure relates to an apparatus evaluation system for evaluating an air conditioning apparatus and an evaluation method for the air conditioning apparatus.

BACKGROUND ART

As disclosed in PTL 1 (Japanese Patent No. 5334909), there has been a technique for operating an air conditioning apparatus to enter a predetermined operating state (this operation is referred to herein as an evaluation operation) and evaluating the air conditioning apparatus on the basis of a predetermined index in the evaluation operation. PTL 1 (Japanese Patent No. 5334909) discloses that an air conditioning apparatus is evaluated in order to sense an insufficient amount of refrigerant at the time of filling with refrigerant or the like in the initial stage of installation of the air conditioning apparatus.

SUMMARY OF INVENTION

< Technical Problem >

Such an evaluation technique for an air conditioning apparatus may be used to evaluate the air conditioning apparatus in the initial stage of installation of the air conditioning apparatus, and to re-evaluate the air conditioning apparatus after the time has passed. In re-evaluation, however, it is difficult to set the thermal load during the evaluation operation to be the same as that in the initial stage of installation of the air conditioning apparatus. For this reason, re-evaluation is typically performed based on an evaluation operation performed under a different thermal load.

However, since a difference in thermal load has a considerable influence on the accuracy of the evaluation, it is preferable that the thermal load during the evaluation operation in the initial stage of installation of the air conditioning apparatus and the thermal load during the evaluation operation performed at the time of the subsequent re-evaluation have values as close as possible.

< Solution to Problem >

An apparatus evaluation system according to a first aspect evaluates, among a first air conditioning apparatus having a first heat source unit and a second air conditioning apparatus having a second heat source unit being different from the first heat source unit that perform air conditioning of a first space, at least the first air conditioning apparatus. The apparatus

evaluation system includes a first evaluation unit and a first air conditioning control unit. The first evaluation unit evaluates the first air conditioning apparatus based on a predetermined first evaluation index obtained in a first evaluation operation in which the first air conditioning apparatus is operated in a predetermined operating state. The first air conditioning control unit controls the second air conditioning apparatus. The first evaluation unit performs a first evaluation process and a second evaluation process. In the first evaluation process, the first evaluation unit evaluates the first air conditioning apparatus based on the first evaluation index obtained in a first operation performed as the first evaluation operation at a time of installation of the first air conditioning apparatus. In the second evaluation process, the first evaluation unit evaluates the first air conditioning apparatus based on the first evaluation index obtained in a second operation performed as the first evaluation operation after the first evaluation process. The first air conditioning control unit operates the second air conditioning apparatus before at least one of the first operation and the second operation of the first air conditioning apparatus is performed and/or while at least one of the first operation and the second operation of the first air conditioning apparatus is being performed.

In the apparatus evaluation system according to the first aspect, the conditions of the thermal load at the time of evaluation in the initial stage of installation of the air conditioning apparatus and the conditions of the thermal load at the time of evaluation after a lapse of time from the installation of the air conditioning apparatus can be brought close to each other, and the air conditioning apparatus can be accurately evaluated.

In an embodiment of the above apparatus evaluation system, the evaluation of the first air conditioning apparatus includes at least one of evaluation of an amount of refrigerant, evaluation of a performance, and evaluation of a failure of the first air conditioning apparatus.

The apparatus evaluation system according to the above embodiment can perform accurate evaluation for various contents of evaluation.

In an embodiment of the above apparatus evaluation system, the first air conditioning control unit operates the second air conditioning apparatus before at least one of the first operation and the second operation of the first air conditioning apparatus is performed and/or while at least one of the first operation and the second operation of the first air conditioning apparatus is being performed to bring a temperature of the first space close to a target temperature and/or bring a humidity of the first space close to a target humidity.

In the apparatus evaluation system according to the above embodiment, the temperature or humidity of the first space at the time of evaluation in the initial stage of installation of the air conditioning apparatus and the temperature or humidity of the first space at the time of evaluation after a lapse of time from the installation of the air conditioning apparatus can be

brought close to each other, and the air conditioning apparatus can be accurately evaluated.

In an embodiment of the above apparatus evaluation system the first air conditioning apparatus and the second air conditioning apparatus are vapor compression air conditioning apparatuses each having a use unit installed in the first space.

In an embodiment of the above apparatus evaluation system, the second evaluation process is repeatedly performed when a first period has elapsed since the first evaluation process and when the first period has elapsed since the second evaluation process previously performed.

In the apparatus evaluation system according to the above embodiment, the air conditioning apparatus can be periodically evaluated with high accuracy.

In an embodiment, the above apparatus evaluation system includes a second evaluation unit and a second air conditioning control unit. The second evaluation unit evaluates the second air conditioning apparatus based on a predetermined second evaluation index obtained in a second evaluation operation in which the second air conditioning apparatus is operated in a predetermined operating state. The second air conditioning control unit controls the first air conditioning apparatus. The second evaluation unit performs a third evaluation process and a fourth evaluation process. In the third evaluation process, the second evaluation unit evaluates the second air conditioning apparatus based on the second evaluation index obtained in a third operation performed as the second evaluation operation at a time of installation of the second air conditioning apparatus. In the fourth evaluation process, the second evaluation unit evaluates the second air conditioning apparatus based on the second evaluation index obtained in a fourth operation performed as the second evaluation operation after the third evaluation process. The second air conditioning control unit operates the first air conditioning apparatus before at least one of the third operation and the fourth operation of the second air conditioning apparatus is performed and/or while at least one of the third operation and the fourth operation of the second air conditioning apparatus is being performed.

In the apparatus evaluation system according to the above embodiment, also for the second air conditioning apparatus, the conditions of the thermal load at the time of evaluation in the initial stage of installation of the air conditioning apparatus and the conditions of the thermal load at the time of evaluation after a lapse of time from the installation of the air conditioning apparatus can be brought close to each other, and the air conditioning apparatus can be accurately evaluated.

An apparatus evaluation method according to a second aspect is an apparatus evaluation method for evaluating, among a first air conditioning apparatus having a first heat source unit and a second air conditioning apparatus having a second heat source unit being different from

the first heat source unit that perform air conditioning of a first space, at least the first air conditioning apparatus. The apparatus evaluation method includes a first evaluation step, a second evaluation step, and an air conditioning control step. In the first evaluation step, the first air conditioning apparatus is evaluated based on a first evaluation index obtained in a first operation in which the first air conditioning apparatus is operated in a predetermined operating state at a time of installation of the first air conditioning apparatus. In the second evaluation step, the first air conditioning apparatus is evaluated based on the first evaluation index obtained in a second operation in which the first air conditioning apparatus is operated in the predetermined operating state after the first evaluation step. In the air conditioning control step, the second air conditioning apparatus is operated before at least one of the first operation and the second operation of the first air conditioning apparatus is performed and/or while at least one of the first operation and the second operation of the first air conditioning apparatus is being performed.

In the apparatus evaluation method according to the second aspect, the conditions of the thermal load at the time of evaluation in the initial stage of installation of the air conditioning apparatus and the conditions of the thermal load at the time of evaluation after a lapse of time from the installation of the air conditioning apparatus can be brought close to each other, and the air conditioning apparatus can be accurately evaluated.

BRIEF DESCRIPTION OF DRAWINGS

[Fig. 1] Fig. 1 is a diagram schematically illustrating an air conditioning system including a first air conditioning apparatus and a second air conditioning apparatus that are evaluation targets of an apparatus evaluation system according to an embodiment of the present disclosure.

[Fig. 2] Fig. 2 is a schematic configuration diagram of the first air conditioning apparatus and the second air conditioning apparatus in the air conditioning system in Fig. 1.

[Fig. 3] Fig. 3 is a block diagram of an apparatus evaluation system according to an embodiment of the present disclosure.

[Fig. 4A] Fig. 4A is an example of a flowchart for evaluating a first air conditioning apparatus at the time of installation of the first air conditioning apparatus, by using the apparatus evaluation system in Fig. 3.

[Fig. 4B] Fig. 4B is an example of a flowchart for evaluating the first air conditioning

CLAIMS

1. An apparatus evaluation system (200) for evaluating, among a first air conditioning apparatus (100A) having a first heat source unit and a second air conditioning apparatus (100B) having a second heat source unit being different from the first heat source unit that perform air conditioning of a first space (S), at least the first air conditioning apparatus, comprising:

a first evaluation unit (212) that evaluates the first air conditioning apparatus based on a predetermined first evaluation index obtained in a first evaluation operation in which the first air conditioning apparatus is operated in a predetermined operating state; and

a first air conditioning control unit (214) that controls the second air conditioning apparatus, wherein

the first evaluation unit performs a first evaluation process for evaluating the first air conditioning apparatus based on the first evaluation index obtained in a first operation performed as the first evaluation operation at a time of installation of the first air conditioning apparatus, and a second evaluation process for evaluating the first air conditioning apparatus based on the first evaluation index obtained in a second operation performed as the first evaluation operation after the first evaluation process, and

the first air conditioning control unit operates the second air conditioning apparatus before at least one of the first operation and the second operation of the first air conditioning apparatus is performed and/or while at least one of the first operation and the second operation of the first air conditioning apparatus is being performed.

2. The apparatus evaluation system according to Claim 1, wherein

the evaluation of the first air conditioning apparatus includes at least one of evaluation of an amount of refrigerant, evaluation of a performance, and evaluation of a failure of the first air conditioning apparatus.

3. The apparatus evaluation system according to Claim 1 or 2, wherein

the first air conditioning control unit operates the second air conditioning apparatus before at least one of the first operation and the second operation of the first air conditioning apparatus is performed and/or while at least one of the first operation and the second operation of the first air conditioning apparatus is being performed to bring a temperature of the first space close to a target temperature and/or bring a humidity of the first space close to a target humidity.

4. The apparatus evaluation system according to any one of Claims 1 to 3, wherein

the first air conditioning apparatus and the second air conditioning apparatus are vapor compression air conditioning apparatuses each having a use unit (50) installed in the first space.

5. The apparatus evaluation system according to any one of Claims 1 to 4, wherein

the second evaluation process is repeatedly performed when a first period has elapsed since the first evaluation process and when the first period has elapsed since the second evaluation process previously performed.

6. The apparatus evaluation system according to any one of Claims 1 to 5, comprising:

a second evaluation unit (212) that evaluates the second air conditioning apparatus based on a predetermined second evaluation index obtained in a second evaluation operation in which the second air conditioning apparatus is operated in a predetermined operating state; and

a second air conditioning control unit (214) that controls the first air conditioning apparatus, wherein

the second evaluation unit performs a third evaluation process for evaluating the second air conditioning apparatus based on the second evaluation index obtained in a third operation performed as the second evaluation operation at a time of installation of the second air conditioning apparatus, and a fourth evaluation process for evaluating the second air conditioning apparatus based on the second evaluation index obtained in a fourth operation performed as the second evaluation operation after the third evaluation process, and

the second air conditioning control unit operates the first air conditioning apparatus before at least one of the third operation and the fourth operation of the second air conditioning apparatus is performed and/or while at least one of the third operation and the fourth operation of the second air conditioning apparatus is being performed.

7. An apparatus evaluation method for evaluating, among a first air conditioning apparatus (100A) having a first heat source unit and a second air conditioning apparatus (100B) having a second heat source unit being different from the first heat source unit that perform air conditioning of a first space (S), at least the first air conditioning apparatus, comprising:

a first evaluation step (S6) of evaluating the first air conditioning apparatus based on a first evaluation index obtained in a first operation in which the first air conditioning apparatus

is operated in a predetermined operating state at a time of installation of the first air conditioning apparatus;

a second evaluation step (S17) of evaluating the first air conditioning apparatus based on the first evaluation index obtained in a second operation in which the first air conditioning apparatus is operated in the predetermined operating state after the first evaluation step; and

an air conditioning control step (S1, S12) of operating the second air conditioning apparatus before at least one of the first operation and the second operation of the first air conditioning apparatus is performed and/or while at least one of the first operation and the second operation of the first air conditioning apparatus is being performed.