VACUUM HEAT INSULATING CONTAINER

Technical Field

[0001] The present disclosure relates to a vacuum heat insulating container that maintains an internal temperature for a long period of time.

Background Art

[0002] A heat insulating container disclosed in PTL 1 has been known as a container that keeps contents cold. The heat insulating container of PTL 1 includes: a container which has a rectangular solid shape and includes an opening; and an upper lid that opens or closes the opening of the container. Moreover, each of the container and the upper lid has a double wall structure. A vacuum insulator having a flat plate shape is accommodated in each of six inter-wall spaces that are inter-wall spaces of the respective surfaces of the container and an inter-wall space of the upper lid.

Citation List

Patent Literature

[0003] PTL 1: Japanese Laid-Open Patent Application Publication No. 2007-126188

Summary of Invention

Technical Problem

[0004] Gas may intrude into the vacuum insulator through an outer covering member or through an adhesive interface between outer covering members. Therefore, from a long-term viewpoint, the thermal insulation performance of the vacuum insulator deteriorates over time. Moreover, the thermal insulation performance of the vacuum insulator may deteriorate when the outer covering member wears by external force applied during use. Therefore, the thermal insulation performance of the vacuum insulator needs to be inspected timely especially when the vacuum insulator is assumed to be used in a case where severe temperature management is required, such as a case of transportation of medicine.

[0005] However, in the heat insulating container of PTL 1, six vacuum insulators that are independent from each other are included at six places in the container and the upper lid as described above. Therefore, these six vacuum insulators need to be individually inspected. Thus, time and labor are required for inspection work.

[0006] Embodiments of the present disclosure provide a vacuum heat insulating container

that can be easily subjected to inspection work.

Solution to Problem

[0007] According to a first aspect of the present disclosure, there is provided a vacuum heat insulating container including: a container main body including an opening and an accommodating space communicating with the opening; and a lid body covering the opening of the container main body, wherein: the container main body includes a heat insulating container body including a first outer covering member that is a molded body made of a nonmetal material and has a gas barrier property, a double wall structure, and a container shape, and a first core member accommodated in an inter-wall space of the first outer covering member, the inter-wall space of the first outer covering member being reduced in pressure; and the lid body includes a heat insulating lid body including a second outer covering member having a sack shape formed by a flexible film which includes a metal layer and has a gas barrier property, and a second core member accommodated in the second outer covering member, an inside of the second outer covering member being reduced in pressure and a lid case accommodating the heat insulating lid body, wherein the heat insulating container body includes a pressure sensor which is accommodated in the inter-wall space of the first outer covering member, is located at a lower portion of the heat insulating container body, and is communicable with an outside; and the lid body includes a visible portion by which a surface of the second outer covering member of the heat insulating lid body is visually confirmable from an outside of the lid case.

[0008] According to the above aspect, the heat insulating container body included in the container main body has the double wall structure formed by the molded body. Therefore, even the heat insulating container body having, for example, a rectangular solid shape can be formed such that the inter-wall spaces communicate with each other. Moreover, since the first outer covering member constituting the heat insulating container body is made of nonmetal, a radio wave emitted from the pressure sensor accommodated in the first outer covering member can be transmitted to an outside. Therefore, the thermal insulation performance of the heat insulating container body can be measured by, for example, a single pressure sensor. Moreover, the heat insulating lid body included in the lid body includes the second outer covering member which is formed by a flexible film including a metal layer. Therefore, when gas intrudes into the heat insulating lid body, and this deteriorates the thermal insulation performance, the surface of the second outer covering member deforms, i.e., for example, the second outer covering member swells. Then, the deformation of the second outer covering member can be visually confirmed through the visible portion. As above, in the vacuum heat insulating container according to the present disclosure, the heat insulating container body can be inspected by, for example, a single

operation performed by the pressure sensor, and the heat insulating lid body can be visually inspected timely. Therefore, inspection work is easy.

[0009] In an embodiment of the vacuum heat insulating container , lid case includes a window as the visible portion.

[0010] According to the above embodiment, while protecting the heat insulating lid body by the lid case, the presence or absence of the deformation of the second outer covering member of the heat insulating lid body can be visually confirmed through the window.

[0011] An embodiment of the vacuum heat insulating container includes a first gas adsorbent located in the inter-wall space of the first outer covering member of the heat insulating container body and a second gas adsorbent located in the second outer covering member of the heat insulating lid body; and a life of gas adsorption ability of the second gas adsorbent is longer than a life of gas adsorption ability of the first gas adsorbent.

[0012] According to the above embodiment, the life of the thermal insulation performance of the heat insulating lid body is longer than the life of the thermal insulation performance of the heat insulating container body. Therefore, when it is confirmed by the inspection that the thermal insulation performance of the heat insulating container body is being maintained, it can be basically determined that the thermal insulation performance of the heat insulating lid body is also being maintained. On this account, the frequency of visual inspection of the heat insulating lid body can be reduced. Thus, the inspection work can be made easier.

[0013] In an embodiment of the vacuum heat insulating container, the container main body further includes a protective member covering an outer surface of the heat insulating container body; and at a portion of the protective member which corresponds to the pressure sensor located at the heat insulating container body, a recess that is recessed from the other portion of the protective member is formed.

[0014] According to the above embodiment, the heat insulating container body can be protected by the protective member from external force applied during use. In addition, when inspecting the thermal insulation performance, a receiver for inspection is pushed into the recess of the protective member from an outside, and therefore, a radio wave from the pressure sensor can be received. On this account, even when communication can be performed only within an extremely short distance, the radio wave from the pressure sensor can be surely received, and therefore, accurate inspection can be performed.

Advantageous Effects of Invention

[0015] Embodiments of the present disclosure can provide a vacuum heat insulating container that can be easily subjected to inspection work.

Brief Description of Drawings

[0016] FIG. 1 is an assembly diagram showing an appearance configuration of a vacuum heat insulating container according to an embodiment of the present disclosure when viewed from an oblique direction.

FIG. 2 is a sectional view of the vacuum heat insulating container.

FIG. 3A is a perspective view of a lid case. FIG. 3B is a perspective view of a window cover attached to the lid case.

FIG. 4A is a schematic diagram showing an inspection system that inspects thermal insulation performance of a heat insulating container body. FIG. 4B is a schematic diagram showing that a heat insulating lid body is visually confirmed.

FIG. 5 is an assembly diagram showing an appearance configuration of a heat storage unit accommodated in the vacuum heat insulating container when viewed from an oblique direction.

FIG. 6 is a sectional view of the vacuum heat insulating container in which the heat storage unit is accommodated.

FIG. 7A is a graph showing time changes of the degree of vacuum of the heat insulating container bodies and the heat insulating lid bodies in a heat insulating space. FIG. 7B is a graph showing life distributions of the heat insulating container body and the heat insulating lid body.

Description of Embodiments

[0017] Hereinafter, an embodiment of the present disclosure will be specifically described with reference to the drawings. In the following description and the drawings, the same reference signs are used for the same or corresponding components, and the repetition of the same explanation is avoided.

[0018] A vacuum heat insulating container 1 shown in FIGS. 1 and 2 is a heat retaining container used to transport or store articles, such as medicines, samples, or foods. The vacuum heat insulating container 1 includes an exterior bag 10 (including an exterior sack 11 and an exterior lid 12), a protection bottom plate 20, a protection box 30, a heat insulating container

CLAIMS

1. A vacuum heat insulating container comprising:

a container main body including an opening and an accommodating space communicating with the opening; and

a lid body covering the opening of the container main body, wherein:

the container main body includes a heat insulating container body including

a first outer covering member that is a molded body made of a nonmetal material and has a gas barrier property, a double wall structure, and a container shape, and

a first core member accommodated in an inter-wall space of the first outer covering member,

the inter-wall space of the first outer covering member being reduced in pressure; and

the lid body includes

a heat insulating lid body including

a second outer covering member having a sack shape formed by a flexible film which includes a metal layer and has a gas barrier property, and

a second core member accommodated in the second outer covering member,

an inside of the second outer covering member being reduced in pressure and

a lid case accommodating the heat insulating lid body, wherein

the heat insulating container body includes a pressure sensor which is accommodated in the inter-wall space of the first outer covering member, is located at a lower portion of the heat insulating container body, and is communicable with an outside; and

the lid body includes a visible portion by which a surface of the second outer covering member of the heat insulating lid body is visually confirmable from an outside of the lid case.

2. The vacuum heat insulating container according to claim 1, wherein~~:~~

the lid case includes a window as the visible portion.

3. The vacuum heat insulating container according to claim 1 or 2, comprising:

a first gas adsorbent located in the inter-wall space of the first outer covering member of the heat insulating container body; and

a second gas adsorbent located in the second outer covering member of the heat

insulating lid body, wherein

a life of gas adsorption ability of the second gas adsorbent is longer than a life of gas adsorption ability of the first gas adsorbent.

4. The vacuum heat insulating container according to any one of claims 1 to 3, wherein:

the container main body further includes a protective member covering an outer surface of the heat insulating container body; and

at a portion of the protective member which corresponds to the pressure sensor located at the heat insulating container body, a recess that is recessed from the other portion of the protective member is formed.