

CLAIMS

[Claim 1]

A thermally expandable laminate characterized in that

5 (1) the laminate comprises at least a thermal expansion layer A and a thermal expansion layer B,

(2) the thermal expansion layer A contains a binder, a flame retardant, a foaming agent, and a carbonizing agent, and when the thermal expansion layer A further contains an inorganic
10 light-weight powder A, the content of the inorganic light-weight powder A in the thermal expansion layer A is less than 5% by volume,

(3) the thermal expansion layer B contains a binder, a flame retardant, a foaming agent, a carbonizing agent, and an
15 inorganic light-weight powder B, and the content of the inorganic light-weight powder B in the thermal expansion layer B is 5 to 70% by volume, and

(4) the inorganic light-weight powder A and the inorganic light-weight powder B each have a bulk density of 0.1
20 to 2.0 g/cm³.

[Claim 2]

The laminate according to claim 1, which is applied to a base material of a structure that needs to be made heat-
25 resistant, wherein the thermal expansion layer B and the thermal expansion layer A are placed in this order.

[Claim 3]

The laminate according to claim 1 or 2, wherein the
30 thermal expansion layer A has a thickness of 0.3 to 5 mm.

[Claim 4]

The laminate according to any one of claims 1 to 3, wherein the thermal expansion layer B has a thickness of 0.3 to 5
35 mm.

[Claim 5]

The laminate according to any one of claims 1 to 4,
wherein the inorganic light-weight powder A and the inorganic
5 light-weight powder B each have a specific surface area of not
less than $0.1 \text{ m}^2/\text{g}$.

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[Claim 1]

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5 (1) the laminate comprises at least a thermal expansion layer A and a thermal expansion layer B,

(2) the thermal expansion layer A contains a binder, a flame retardant, a foaming agent, and a carbonizing agent, and when the thermal expansion layer A further contains an inorganic
10 light-weight powder A, the content of the inorganic light-weight powder A in the thermal expansion layer A is less than 5% by volume,

(3) the thermal expansion layer B contains a binder, a flame retardant, a foaming agent, a carbonizing agent, and an
15 inorganic light-weight powder B, and the content of the inorganic light-weight powder B in the thermal expansion layer B is 5 to 70% by volume, and

(4) the inorganic light-weight powder A and the inorganic light-weight powder B each have a bulk density of 0.1
20 to 2.0 g/cm³.

[Claim 2]

The laminate according to claim 1, which is applied to a base material of a structure that needs to be made heat-
25 resistant, wherein the thermal expansion layer B and the thermal expansion layer A are placed in this order.

[Claim 3]

The laminate according to claim 1 or 2, wherein the
30 thermal expansion layer A has a thickness of 0.3 to 5 mm.

[Claim 4]

The laminate according to any one of claims 1 to 3, wherein the thermal expansion layer B has a thickness of 0.3 to 5
35 mm.

[Claim 5]

The laminate according to any one of claims 1 to 4,
wherein the inorganic light-weight powder A and the inorganic
5 light-weight powder B each have a specific surface area of not
less than $0.1 \text{ m}^2/\text{g}$.