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**Datasheet for the decision
of 6 July 2023**

Case Number: T 2148/21 - 3.3.05

Application Number: 13825301.8

Publication Number: 2883848

IPC: C03C27/12, B32B17/10, B32B27/30

Language of the proceedings: EN

Title of invention:
LAMINATED GLASS AND METHOD OF MOUNTING LAMINATED GLASS

Patent Proprietor:
Sekisui Chemical Co., Ltd.

Opponent:
Pilkington Group Limited

Headword:
Laminated glass/Sekisui Chemical

Relevant legal provisions:
EPC Art. 56, 84, 123(2)
RPBA 2020 Art. 12(6)

Keyword:

Inventive step - Main request (no) - Auxiliary requests 1, 4-6, 9 (no)

Claims - clarity - Auxiliary requests 3, 7, 8, 12 (no)

Amendments - added subject-matter - Auxiliary requests 2, 10, 11 (yes)

Late-filed request - Auxiliary requests 13-16 - admitted (no)

Decisions cited:

G 0003/14

Catchword:



Beschwerdekammern

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Case Number: T 2148/21 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 6 July 2023

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted on 8 October 2021
revoking European patent No. 2883848 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman E. Bendl
Members: S. Besselmann
 O. Loizou

Summary of Facts and Submissions

- I. The patent proprietor's appeal is against the opposition division's decision to revoke the European patent EP 2 883 848 B1. The patent in suit concerns a laminated glass and a method of mounting laminated glass.
- II. The following documents are of relevance here:
- D4 US 2006/0050425 A1
 - D9 US 2006/0110593 A1
 - D14 US 2012/0162752 A1
 - D18 Experimental report by the patent proprietor relating to Example 30 and Comparative Examples 5 and 6, filed on 22 July 2019
 - D19 Experimental report by the patent proprietor relating to Tests 1-10, filed on 17 July 2020
 - D20 Experimental report by the patent proprietor relating to Examples 2-6, 12 and 24-29, filed on 17 July 2020
 - D21 Experimental report by the patent proprietor relating to Tests 11-14, filed on 6 May 2021
- III. The patent proprietor (appellant), in their statement of grounds of appeal, defended the patent as granted and maintained the requests filed before the opposition division. They additionally filed auxiliary requests 13-16.
- IV. Claim 1 of the patent as granted (main request) reads as follows:
- "Laminated glass comprising a first laminated glass member, a second laminated glass member and an interlayer film arranged between the first laminated*

glass member and the second laminated glass member, the interlayer film being provided with an infrared ray reflection layer which reflects infrared rays, a first resin layer which is arranged on a first surface side of the infrared ray reflection layer and contains a thermoplastic resin and an ultraviolet ray shielding agent, and a second resin layer which is arranged on a second surface side opposite to the first surface of the infrared ray reflection layer and contains a thermoplastic resin, an ultraviolet ray shielding agent and heat shielding particles, the content of the heat shielding particles contained in the second resin layer being 0.01% by weight or more and 6% by weight or less in 100% by weight of the second resin layer, the first laminated glass member being arranged on the outside of the first resin layer in the interlayer film, the second laminated glass member being arranged on the outside of the second resin layer in the interlayer film, and the infrared ray transmittance in the wavelength of 780 to 2100 nm of the whole layer composed of the first laminated glass member and the first resin layer being higher than the infrared ray transmittance in the wavelength of 780 to 2100 nm of the whole layer composed of the second laminated glass member and the second resin layer."

- V. Claim 1 of auxiliary request 1 differs from the main request in that the definition of the second resin layer is amended as follows (additions underlined, deletions struck-through):

"..., and a second resin layer which is arranged on a second surface side opposite to the first surface of the infrared ray reflection layer and contains a thermoplastic resin, an ultraviolet ray shielding agent, and heat shielding particles and at least one kind among a phthalocyanine compound, a

naphthalocyanine compound and an anthracyanine compound, wherein the content of the heat shielding particles contained in the second resin layer ~~being~~ is 0.01% by weight or more and 6% by weight or less in 100% by weight of the second resin layer, ..."

Claim 1 of auxiliary request 2 differs from auxiliary request 1 in that the expression "*, an oxidation inhibitor*" is inserted in the definition of the second resin layer directly before the expression "*and at least one kind among a phthalocyanine compound, a naphthalocyanine compound and an anthracyanine compound*".

Claim 1 of auxiliary request 3 differs from the main request on account of the following insertion in the definition of the second resin layer (shown underlined):

"..., and a second resin layer which is arranged on a second surface side opposite to the first surface of the infrared ray reflection layer, wherein the first resin layer and the second resin layer are each directly layered on the infrared ray reflection layer, and wherein the second resin layer contains a thermoplastic resin, an ultraviolet ray shielding agent and heat shielding particles, ..."

Claim 1 of auxiliary request 4 differs from the main request on account of the following insertion in the definition of the second resin layer (shown underlined):

"..., and a second resin layer which is arranged on a second surface side opposite to the first surface of the infrared ray reflection layer, wherein both of the first resin layer and the second resin layer contain an oxidation inhibitor, the

oxidation inhibitor being selected from the group consisting of a phenol-based oxidation inhibitor, a sulfur-based oxidation inhibitor, a phosphorus-based oxidation inhibitor and combinations thereof, and wherein the second resin layer further contains a thermoplastic resin, an ultraviolet ray shielding agent and heat shielding particles, ..."

Compared with auxiliary request 4, claim 1 in auxiliary request 5 additionally specifies the following in relation to the oxidation inhibitor: "wherein the phenol-based oxidation inhibitor is an oxidation inhibitor having a phenol skeleton, the sulfur-based oxidation inhibitor is an oxidation [sic] containing a sulfur atom and the phosphorus-based oxidation inhibitor is an oxidation inhibitor containing a phosphorus atom". This expression is inserted directly after the expression "a phosphorus-based oxidation inhibitor and combinations thereof".

Claim 1 of auxiliary request 6 differs from the main request on account of the following insertion in the definition of the second resin layer (shown underlined):

"..., and a second resin layer which is arranged on a second surface side opposite to the first surface of the infrared ray reflection layer, wherein the first resin layer contains a plasticizer and the second resin layer contains a plasticizer, wherein the plasticizer includes at least one kind among triethylene glycol di-2-ethylhexanoate and triethylene glycol di-2-ethylbutyrate, and wherein the second layer further contains a thermoplastic resin, an ultraviolet ray shielding agent and heat shielding particles ..."

Claim 1 of auxiliary request 7 essentially combines the amendments of auxiliary requests 1, 3, 4 and 6.

Compared with auxiliary request 7, claim 1 of auxiliary request 8 additionally includes the same amendment as in auxiliary request 5.

Claim 1 of auxiliary request 9 differs from the main request in that the definition of the second resin layer is amended as follows:

"..., and a second resin layer which is arranged on a second surface side opposite to the first surface of the infrared ray reflection layer and contains a thermoplastic resin, an ultraviolet ray shielding agent and heat shielding particles, wherein the heat shielding particles contain at least one kind among antimony-doped tin oxide particles, gallium-doped zinc oxide particles, indium-doped zinc oxide particles, tin-doped indium oxide particles and tungsten oxide particles, and wherein the content of the heat shielding particles contained in the second resin layer being is 0.01% by weight or more and 6% by weight or less in 100% by weight of the second resin layer, ..."

Claim 1 of auxiliary request 10 differs from the main request in that the definition of the second resin layer is amended as follows:

"..., and a second resin layer which is arranged on a second surface side opposite to the first surface of the infrared ray reflection layer and contains a thermoplastic resin, an ultraviolet ray shielding agent, ~~and~~ heat shielding particles and at least one kind of Ingredient X among a phthalocyanine compound, a naphthalocyanine compound and an anthracyanine compound, wherein the content of Ingredient X in 100% by weight of the second resin layer is 0.1% by weight

or less, and wherein the content of the heat shielding particles contained in the second resin layer ~~being~~ is 0.01% by weight or more and 6% by weight or less in 100% by weight of the second resin layer, ..."

Claim 1 of auxiliary request 11 differs from auxiliary request 10 in that the content of Ingredient X in 100% by weight of the second resin layer is "0.05% by weight or less".

Auxiliary request 12 combines the amendments of auxiliary requests 1 and 3.

Claim 1 of auxiliary request 13 differs from the main request in that the following expression is added at the end of the claim:

", wherein the infrared ray reflection layer is a resin film with metal foil."

Auxiliary request 14 combines the amendments of auxiliary requests 12 and 13.

Auxiliary request 15 differs from auxiliary request 13 in that the following expression is added at the end of the claim:

"and the metal foil includes a material selected from aluminum, copper, silver, gold, palladium, and an alloy containing these metals."

Auxiliary request 16 combines the amendments of auxiliary requests 12 and 15.

VI. The appellant's arguments, where relevant to the present decision, can be summarised as follows.

Main request

D4 was a reasonable choice for the closest prior art. The subject-matter of claim 1 differed from D4 on account of the presence of a UV absorbent in both the first and the second resin layer. This had the technical effect of improving the durability and lifetime of the whole interlayer film. In particular, it promoted prolonged high visible light transmittance. This was demonstrated in the experimental report D18. The problem was to provide high initial values of heat shielding properties and visible light transmittance (paragraph [0009] of the patent in suit), and to retain these high values for a long time during use (paragraph [0094]).

The skilled person had no reason to turn to D9, which did not teach the combination of a heat reflecting layer with a heat absorbing layer. D4 and D9 were thus conceptually very different.

Even if the skilled person had nevertheless consulted D9, it would not have taught them that a UV absorbent could be present in the heat shielding layer. The skilled person would rely on the general teaching and not the examples; the additional presence of UV absorbent in the heat shielding layer in the examples of D9 was accidental, and the skilled person would avoid it to save costs.

Even if the skilled person did try to apply the teaching of D9 to D4, they would take a stepwise approach and add the UV absorbent to one layer at a time. Adding the UV absorbent to the heat shielding layer resulted in a deterioration of the properties, as could be seen in Comparative Example 5 of D18. The skilled person would therefore have been discouraged

from adding the UV absorbent to further layers and would not have arrived at the claimed subject-matter.

Furthermore, even if the two-layer laminate of Example 1 of D9 were inserted in D4, this would not result in the claimed interlayer film, in which the first and second resin layers containing the UV absorbent were arranged on opposite sides of the infrared reflection layer.

Auxiliary request 1

Ingredient X increased the heat shielding effect, but the interlayer became more prone to degradation due to UV rays. The degradation of Ingredient X would considerably impair long-term visible light transmittance. This was prevented by the presence of the UV shielding agent. The effects of Ingredient X and of the UV shielding agent were thus functionally interdependent, and a combined effect was obtained. The skilled person would not have combined the teachings of D14 and D4 because D14 taught away from including a heat reflecting layer (paragraph [0011]). D14 did not teach the presence of a UV shielding agent in the heat shielding layer, and the skilled person would not extract any such teaching from the examples. Furthermore, the UV shielding layer and the heat shielding layer were directly laminated on each other in D14.

Auxiliary request 2

The presence of an oxidation inhibitor in the second resin layer did not extend beyond the content of the application as originally filed because it was one of a very limited number of alternatives and was supported by the examples.

Auxiliary requests 3, 7, 8 and 12

The skilled person could easily distinguish the IR reflection layer from the other layers. A layer of a multilayer IR reflection layer was very thin. Furthermore, materials that could constitute IR reflection layers were known and only a limited number of materials could be used.

Auxiliary requests 4 and 5

The oxidation inhibitor contributed to the prolonged functioning of the layers and enhanced the effect of the UV shielding agent.

Auxiliary request 9

The subject-matter of this request was even more remote from the disclosure of D4 than the subject-matter of the main request due to the specification of the heat shielding particles which did not include hexaboride.

Auxiliary requests 10 and 11

The additional feature relating to the content of Ingredient X in the second resin layer had been disclosed in paragraphs [0074] and [0079] of the application as originally filed (A-publication). The examples supported specifying the content in the second resin layer.

Auxiliary requests 13-16

These requests could not have been filed earlier because it only became clear with the decision that the teaching of D9 was considered to be applicable to any laminate (item 7.4 on page 16 of the impugned decision). These requests were also motivated by analysis results of commercial glass products which could only be obtained once the pandemic situation was under control. It was only in the light of these

results that the subject-matter of said requests appeared attractive for the proprietor for the first time.

- VII. The respondent's arguments are reflected in the reasons for the decision.

- VIII. The appellant (patent proprietor) requested that the decision under appeal be set aside and the opposition be rejected (main request) or, in the alternative, that the patent be maintained in amended form on the basis of one of auxiliary requests 1 to 16 filed with the statement of grounds of appeal.

The respondent (opponent) requested that the appeal be dismissed.

Reasons for the Decision

Main request

- 1. Inventive step
 - 1.1 The patent in suit relates to a laminated glass with an interlayer film, used for automobiles, buildings etc., having high heat shielding properties and high visible light transmittance (paragraphs [0001] and [0009]).

 - 1.2 D4 relates to a similar purpose (paragraphs [0001] and [0007]) and is a suitable starting point for assessing inventive step. D4 describes a laminated glass in which the interlayer film is composed of a first thermo-plastic resin layer, a heat reflecting film and a

second thermoplastic resin layer, the second thermoplastic resin layer having a heat shielding function (Figure 1; claim 2). According to Working Example 1, these are a first polyvinyl butyral (PVB) layer free from ITO fine particles, a heat reflecting film and a second PVB layer with ITO fine particles dispersed therein functioning as a heat absorbing layer. The content of the ITO fine particles is 0.7% by weight (paragraphs [0033] and [0034]). D4 already provides high (initial) heat shielding properties and visible light transmittance (Working Example 1).

- 1.3 The technical problem may be considered that of better retaining the desired properties, in particular the visible light transmittance, during use ("*the visible light transmittance becomes further difficult to be lowered*", paragraph [0094] of the patent in suit).
- 1.4 As the solution to this problem, the claimed laminated glass is proposed, in which the first and second resin layers of the interlayer film both contain a UV shielding agent.
- 1.5 In light of the experimental report D18, it may be accepted that this problem has been solved.
- 1.6 D9 also relates to a laminated glass comprising an interlayer film containing a heat shielding metal oxide and already addresses the problem of deteriorating visible light transmittance or durability to light (D9, paragraph [0012]). D9 attributes this problem of deterioration to a chemical change of the heat shielding metal oxide by UV rays, which affects the resin matrix (same paragraph). As the solution to this problem, D9 proposes a UV shielding layer (paragraphs [0009] and [0014]). While D9 separately refers to a

"heat shielding layer" and a "UV shielding layer" (see e.g. claim 1 of D9), it is clear from the experimental protocol used (Example 1, paragraphs [0103]-[0107]) that the UV shielding agent is present in both these layers in the exemplified embodiments. Specifically, a plasticizer solution containing a UV absorbent is prepared and the ITO powder is loaded into the obtained plasticizer solution, which is then added to PVB resin to obtain a heat shielding layer (paragraphs [0103]-[0106]; heat shielding layer A). This ITO-containing heat shielding layer consequently contains a UV absorbent. A UV shielding layer containing no ITO is also produced by using the same initial UV absorbent-containing plasticizer solution and adding it to PVB resin (paragraph [0107]).

There is no reason why the skilled person would not rely on this example in D9. The observation that the general description in D9 (paragraphs [0016]-[0054]) does not explicitly mention the additional presence of UV shielding agent in the heat shielding layer would not lead the skilled person to disregard Example 1 of D9, or to disregard the presence of UV shielding agent in the heat shielding layer as an accidental, non-functional aspect of it. It is not convincing either that the skilled person would refrain from a UV shielding agent merely to save costs; it may even be more efficient if the same UV absorbent-containing solution is used in both resin layers, as in Example 1 of D9.

Since it is the ITO-containing layer which is prone to degradation by UV rays (D9, paragraphs [0012] and [0013]), the skilled person would expect that the presence of the UV shielding agent in the heat

shielding layer may contribute to the desired function of preventing this degradation.

- 1.7 Example 1 of D9 illustrates the general experimental protocol which is also used in the other examples, in particular for preparing heat shielding layer B (Example 2). The examples do not contradict the general description of D9. It can be seen that they solve the stated problem (Tables 1 and 3 and paragraphs [0148] and [0149]).

The skilled person would thus derive that the presence of the UV shielding agent in both the heat shielding layer and the UV shielding layer is a particular embodiment of the teaching of D9, and they would rely on this embodiment because the successful solution of the technical problem has been demonstrated for it.

- 1.8 In summary, the skilled person starting from D4 would be faced with the problem of deteriorating visible light transmittance and would find the solution to this problem in D9, namely the presence of a UV shielding layer and a heat shielding layer with UV absorbent present in both these layers.

- 1.9 The skilled person would readily apply the solution taught in the examples of D9 to D4, in particular as both documents relate to a structurally similar film of laminated layers comprising an ITO-containing PVB layer. By contrast with the appellant's view, it cannot be said that the teaching of D4 and D9 would be conceptually so different from one another that the skilled person would not have combined them.

The teaching of D9 is not limited to films consisting of a UV shielding layer and a heat shielding layer; see

also paragraphs [0099] and [0100]. Moreover, the UV shielding layer is not required to be directly adjacent to the heat shielding layer, nor can any such requirement be derived from the intended functions of the layers. The additional presence of a heat reflecting film in Example 1 of D4 would therefore not have prevented the skilled person from applying the teaching of D9 to the structure exemplified in D4.

1.10 By contrast with the appellant's view, applying the teaching of D9 to D4 would not entail additional modifications such as providing additional layers. Nor would it involve adding or inserting the two-layer laminate of Example 1 of D9 as an additional layer in the structure known from D4. On the contrary, the skilled person would immediately understand that the teaching of D9 regarding the presence of an ITO-containing heat shielding layer and a UV shielding layer, both containing a UV absorbent agent, may be accomplished in the structure known from D4 by adding a UV absorbent to the relevant layers, i.e. to both the ordinary and the ITO-containing PVB layer, which according to D4 are arranged on opposite sides of the heat reflection layer. There is thus no need to add further layers to the structure known from D4, the result being a laminated glass with an interlayer film within the scope of claim 1 at issue.

1.11 The appellant's argument that the skilled person wishing to implement the teaching of D9 would have taken a stepwise approach and in a first step would have added the UV absorbent only to the heat shielding layer is not convincing either. This first step would in fact reflect the comparative examples of D9 in which there is only the heat shielding layer containing a UV absorbent (heat shielding layer A or B, see

Table 3) but no additional UV shielding layer. This would be contrary to the teaching of D9, which requires the presence of an additional UV shielding layer (i.e. a UV shielding layer in addition to the heat shielding layer) as an essential feature (claim 1 of D9). Whether adding the UV absorbent to only the heat shielding layer would have a disadvantageous effect, as argued by the appellant, is thus irrelevant because, as indicated, the skilled person would not have taken the stepwise approach in the first place.

- 1.12 The subject-matter of claim 1 consequently lacks an inventive step, in line with the impugned decision.

Auxiliary request 1

2. Inventive step

2.1 Reference is made to the comments regarding the main request (see point 1.). In auxiliary request 1, it is additionally specified that the second resin layer contains at least one kind from among a phthalocyanine compound, a naphthalocyanine compound and an anthracyanine compound ("Ingredient X"). The presence of Ingredient X constitutes a further difference over D4.

2.2 According to the patent in suit, this ingredient functions as a heat shielding compound (paragraph [0075]).

2.3 The appellant argued that the effect of Ingredient X was not limited to additional heat shielding but was functionally interdependent with the UV shielding agent, giving rise to a combined effect. Impinging UV

rays would provoke the degradation of Ingredient X and would considerably impair long-term visible light transmittance. This was prevented by the presence of the UV shielding agent.

- 2.4 However, the available examples in the patent in suit and in test reports D19 and D21, in so far as they relate to Ingredient X, only show the initial properties. It can be seen that increasing amounts of X result in better heat shielding but lower visible light transmittance (D19, Table 5, Tests 1-3; D21, Table 5, Tests 4-7). While these examples do not illustrate the stability over time and thus do not prove the combined effect, it may nevertheless be acknowledged that there is a functional interdependence of using Ingredient X and a UV shielding layer because this is confirmed by D14.
- 2.5 The problem may thus be considered that of providing a laminated glass that has improved heat shielding and good visible light transmittance and better retains these properties over time.
- 2.6 The skilled person would have been aware of D14, which relates to a laminated glass having high heat shielding properties (paragraph [0001]). D14 already teaches how to improve the heat shielding properties while maintaining the visible light transmittance, and how to maintain these properties over time.

Specifically, D14 addresses the problem of insufficient heat shielding properties of laminated glass comprising ITO particles in the interlayer film (paragraph [0008]). D14 teaches that the additional presence of Ingredient X (in conjunction with the heat shielding particles) increases the heat shielding properties and

the visible light transmittance (paragraph [0042]). D14 furthermore describes that the heat shielding properties eventually decrease (paragraph [0044]). According to D14, a UV shielding layer is therefore provided (paragraph [0044]). It is taught that this prevents a chemical change of Ingredient X and a deterioration of the resin which can be caused by this chemical change (same paragraph). The heat shielding layer preferably also contains a UV shielding agent (paragraph [0096]), as is additionally shown in e.g. Example 1 of D14. Furthermore, the examples show good retention of the desired properties over time (Table 5).

2.7 The skilled person starting from D4 and faced with the problem posed (see point 2.5) would readily apply this teaching of D14 to D4, with the expectation of obtaining improved heat shielding and durability over time. They would thus provide an Ingredient X and a UV shielding agent in the heat shielding layer. They would also provide a UV shielding agent in the first resin layer, referred to as the "*ordinary first interlayer*" in D4, such that the first resin layer functions as a UV shielding layer within the meaning of D14, as indicated.

2.8 The board cannot agree with the appellant's view that this would entail laminating the UV shielding layer directly on a surface of the heat shielding layer. While this structure is present in the examples of D14, it is not an essential feature of the teaching of D14. In the examples, each layer (the heat shielding layer and the UV shielding layer) is separately produced. It cannot be concluded that they necessarily have to be arranged in the exemplified directly laminated structure. The skilled person applying the teaching of

D14 to D4 has no reason to additionally modify the arrangement of the layers in D4, in which the first resin layer and the heat shielding layer are adhered to opposite surfaces of the heat reflecting film.

2.9 In the general part of D14 it is expressly foreseen that a different layer from the heat shielding layer and the UV shielding layer may be sandwiched between them (paragraph [0052]). The heat reflecting film in D4 may be regarded as such a sandwiched layer. Its presence is consequently compatible with D14.

2.10 By contrast with the appellant's arguments, the film's function as specifically a heat reflecting film would not have prevented the skilled person from applying the teaching of D14 to it either.

D14 teaches that heat reflecting laminated glass that has a metal thin film or contains heat reflecting PET reflects not only infrared rays but also communication waves and is therefore not desired in a windshield (paragraph [0011]). However, these disadvantages of the indicated heat reflecting films are unrelated to the problem under consideration here, which concerns the heat shielding properties and the visible light transmittance. Moreover, they relate to different heat reflecting films from that preferred in D4, namely one that does not include metal and is specifically a film formed by layering polyethylene naphthalate and poly(methyl methacrylate) (paragraph [0029] of D4).

2.11 The skilled person starting from D4 would therefore have arrived at the subject-matter of claim 1 by following the guidance of D14 alone, which suggests both distinguishing features.

2.12 The subject-matter of claim 1 consequently lacks an inventive step.

Auxiliary request 2

3. Article 123(2) EPC

3.1 Compared with auxiliary request 1, claim 1 includes the additional feature that the second resin layer contains an oxidation inhibitor.

3.2 In the application as originally filed (paragraph [0109] of the translation, corresponding to paragraph [0108] of the A-publication), the presence of an oxidation inhibitor in the second resin layer is disclosed as one of three alternatives, the other alternatives relating to the presence of an oxidation inhibitor in the first resin layer and to the presence of an oxidation inhibitor in the first and second resin layers. Each of these alternatives is (equally) preferred, there being no preference for the presence of an oxidation inhibitor in the second resin layer.

The examples cannot provide a pointer to the presence of an oxidation inhibitor in specifically the second resin layer either, because the oxidation inhibitor is additionally present in the first resin layer.

The claimed subject-matter involves multiple selections within the general disclosure of the application as originally filed, of not only the oxidation inhibitor specifically in the second resin layer, but additionally of at least the heat shielding particles in addition to Ingredient X (paragraphs [0075] and [0081] of the translation). The combination of features

in claim 1 is therefore not directly and unambiguously derivable from the application as originally filed.

- 3.3 In conclusion, the requirements of Article 123(2) EPC are not met.

Auxiliary request 3

4. Article 84 EPC

- 4.1 Compared with the main request, claim 1 specifies that "*the first resin layer and the second resin layer are each directly layered on the infrared ray reflection layer*". This amendment is based on the description. Pursuant to G 3/14 (catchword), it may be examined whether that amendment introduces a lack of clarity.

- 4.2 The infrared ray reflection layer may itself comprise multiple layers (claim 6). However, no clear criterion is available to determine whether a layer is part of a multilayer IR reflection layer, or an additional intermediate layer. In a case such as this, it is unknown whether the first (or second) resin layer is directly layered on a multilayer IR reflection layer or on an intermediate layer. The appellant's argument that a layer of a multilayer IR reflection layer could be distinguished from other layers because it was very thin is not convincing. There is no evidence that it is necessarily thinner than all the other layers that may possibly be included in interlayer films, irrespective of their function. Nor is there any evidence for the appellant's assertion that the reference to the infrared ray reflection layer, which is a functional definition, specified a distinct set of possible layer

materials so that it could be clearly identified and delimited within an interlayer film.

- 4.3 The amendment consequently results in a lack of clarity.

Auxiliary request 4

5. Inventive step

- 5.1 Reference is made to the comments regarding the main request which apply accordingly.

- 5.2 The presence of an oxidation inhibitor in the first and second resin layers constitutes an additional difference over D4.

- 5.3 An oxidation inhibitor (BHT) is present in all the resin layers exemplified in the patent in suit and in experimental reports D18-D21. There is no comparative example where an oxidation inhibitor is not present. The examples as a whole thus do not specifically address the technical effect of the additional presence of an oxidation inhibitor. Nevertheless, on the basis of the inhibitor's intrinsic function to prevent oxidation, and in line with paragraph [0115], it may be assumed that it contributes to solving the problem posed (see point 1.3) and improves the durability.

- 5.4 However, adding an oxidation inhibitor is common general knowledge (D1, page 617, "Stabilization Mechanisms") and is already taught in the secondary document D9 (paragraphs [0052]-[0054] and the examples); in fact, the same oxidation inhibitor is used as in the examples of the patent in suit (BHT).

The skilled person applying the teaching of D9 to D4 would thus readily include an oxidation inhibitor, with the expectation of obtaining some durability benefit in the light of its intrinsic function.

- 5.5 This additional feature therefore does not support an inventive step.

Auxiliary request 5

6. Claim 1 of auxiliary request 5 has effectively the same scope as claim 1 of auxiliary request 4. The appellant did not contest that the considerations were the same as for auxiliary request 4.

The subject-matter of claim 1 thus lacks an inventive step for the same reasons (see point 5.).

Auxiliary request 6

7. Inventive step

- 7.1 Reference is made to the comments regarding the main request (point 1.). Compared with the main request, claim 1 specifies that both the first resin layer and the second resin layer contain a plasticizer, and that the plasticizer includes at least one kind from among triethylene glycol di-2-ethylhexanoate and triethylene glycol di-2-ethylbutyrate (paragraph [0073]). However, the resin layers in D4 contain triethylene glycol di-2-ethylbutyrate (see Working Example 1). The plasticizer is a component of the vinyl-based resin composition. The skilled person would therefore understand that the "*ordinary first interlayer*", i.e. the PVB interlayer

that is free from ITO fine particles, also contains the plasticizer.

- 7.2 The feature relating to the plasticizer thus does not provide any additional delimitation from D4, and an inventive step is lacking for the same reasons as set out for the main request.

Auxiliary requests 7 and 8

8. Article 84 EPC

- 8.1 As in auxiliary request 3, claim 1 in auxiliary requests 7 and 8 also specifies that "*the first resin layer and the second resin layer are each directly layered on the infrared ray reflection layer*". The requirements of Article 84 EPC are consequently not met for the same reasons as indicated for auxiliary request 3 (see point 4.).

Auxiliary request 9

9. Inventive step

- 9.1 Reference is made to the comments regarding the main request (point 1.). Compared with the main request, claim 1 specifies that the heat shielding particles contain at least one kind from among antimony-doped tin oxide particles, gallium-doped zinc oxide particles, indium-doped zinc oxide particles, tin-doped indium oxide particles and tungsten oxide particles. However, using ITO (tin-doped indium oxide) is already disclosed in documents D4 (Working Example 1) and D9 (Example 1)

and thus does not provide any additional delimitation from this prior art.

- 9.2 An inventive step is therefore lacking for the same reasons as set out for the main request.

Auxiliary requests 10 and 11

10. Article 123(2) EPC

10.1 Compared with claim 1 as granted, it is additionally specified that the second resin layer contains at least one kind from among a phthalocyanine compound, a naphthalocyanine compound and an anthracyanine compound (as in auxiliary request 1; based on claim 9 as granted). Furthermore, claim 1 was amended to stipulate an upper limit of the content of Ingredient X in 100% by weight of the *second* resin layer ("0.1% by weight or less" in auxiliary request 10, "0.05% by weight or less" in auxiliary request 11).

10.2 According to the appellant, this amendment was based on paragraphs [0074] and [0079] (referring to the A-publication, corresponding to paragraphs [0075] and [0080] as originally filed). It was supported by the examples.

10.3 Paragraph [0080] as originally filed relates to preferred lower and upper limits, according to various levels of preference, of the content of Ingredient X "*in the case where the first resin layer or the second resin layer contains the Ingredient X*". It is also stated that "[w]hen the content of the Ingredient X in the first and second resin layers is not less than the above lower limit and not more than the above upper

limit, the heat shielding properties are sufficiently enhanced and the visible light transmittance is sufficiently enhanced".

- 10.4 Amended claim 1, by contrast, specifies only the upper limit in the second resin layer but not any lower limit. It is also silent as to the additional presence and content of Ingredient X in the *first* resin layer, thus allowing for the presence of an undefined content of Ingredient X in the first resin layer. The functional requirement regarding the IR ray transmittance of the relevant "whole layers" does not imply any clear restriction in this regard.
- 10.5 The examples do not constitute a suitable pointer towards extracting only the disclosure regarding the upper limit of the content of Ingredient X and applying it to the second resin layer only. Where the examples contain Ingredient X, it is present in the second resin layer but absent in the first resin layer, and its content in the second resin layer is not only below the specified upper limit but also above the specified lower limit.
- 10.6 The subject-matter of claim 1 thus extends beyond the content of the application as originally filed.

Auxiliary request 12

11. Article 84 EPC

- 11.1 As in auxiliary request 3, claim 1 in auxiliary request 12 also specifies that "*the first resin layer and the second resin layer are each directly layered on the infrared ray reflection layer*". The requirements of

Article 84 EPC are consequently not met for the same reasons as indicated for auxiliary request 3 (see point 4.).

Auxiliary requests 13-16

12. Article 12 RPBA 2020

12.1 Auxiliary requests 13-16 were filed for the first time with the statement of grounds of appeal. They constitute further attempts to address the opposition division's finding of lack of inventive step. However, the issue of lack of inventive step as dealt with by the opposition division had already been raised in the notice of opposition. This included an objection based on the combination of D4 with D9 (point 6.1.6 on page 15 of the notice of opposition). The question whether the teaching of D9 was applicable to other laminates did not newly arise during the oral proceedings before the opposition division.

The point in time when the filing of auxiliary requests 13-16 "appeared attractive for the proprietor for the first time" on the basis of commercial considerations is irrelevant.

12.2 The filing of further auxiliary requests thus cannot be regarded as a response to a procedural development in the opposition proceedings.

Auxiliary requests 13-16 should therefore have been filed before the opposition division. They are not taken into consideration (Article 12(6) RPBA 2020).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated