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**Datasheet for the decision  
of 5 July 2021**

**Case Number:** T 0908/18 - 3.3.05

**Application Number:** 09796048.8

**Publication Number:** 2382164

**IPC:** C03C17/36

**Language of the proceedings:** EN

**Title of invention:**

HEAT TREATABLE COATED GLASS PANE

**Patent Proprietor:**

Pilkington Group Limited

**Opponent:**

SAINT-GOBAIN GLASS FRANCE

**Headword:**

Coated glass/Pilkington

**Relevant legal provisions:**

RPBA 2020 Art. 13(2)

EPC Art. 123(2), 56

**Keyword:**

Late-filed request - admitted (yes)  
Amendments - allowable (yes)  
Inventive step - (yes)

**Decisions cited:**

T 1480/16, T 0995/18

**Catchword:**



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Case Number: T 0908/18 - 3.3.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.05**  
**of 5 July 2021**

**Appellant:** SAINT-GOBAIN GLASS FRANCE  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 25 January 2018  
rejecting the opposition filed against European  
patent No. 2382164 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman**            G. Glod  
**Members:**            S. Besselmann  
                              S. Fernández de Córdoba

## Summary of Facts and Submissions

- I. The opponent's (appellant's) appeal lies from the opposition division's decision to reject the opposition against European patent EP 2 382 164 B1. The patent in suit concerns a heat treatable coated glass pane.
- II. The decision under appeal referred to the following documents, *inter alia*:
- |    |                   |
|----|-------------------|
| D2 | WO 2007/080428 A1 |
| D4 | WO 2007/101963 A2 |
| D6 | EP 0 718 250 B1   |
| D7 | WO 2005/000578    |
- III. The patent proprietor (respondent) defended the granted patent and submitted seven auxiliary requests with their reply (5 October 2018). These were the same as those already submitted during the opposition proceedings.
- IV. The board issued a communication pursuant to Article 15(1) RPBA 2020 informing the parties of its preliminary opinion that the subject-matter of claim 1 as granted was novel but did not involve an inventive step. According to this preliminary opinion, claim 1 of then pending auxiliary request 6 appeared to be novel and inventive, but there were objections against several dependent claims.
- V. The respondent then withdrew auxiliary requests 1, 3, 6 and 7, re-numbered the remaining auxiliary requests and filed new fourth and fifth auxiliary requests (2 September 2020).

VI. The appellant contested the admissibility of the new fourth and fifth auxiliary requests of 2 September 2020 into the proceedings and raised inventive-step objections against these requests.

VII. During the oral proceedings before the board (5 July 2021), the respondent maintained this fourth auxiliary request as their main and sole request and withdrew all the other requests.

VIII. Claim 1 of this sole request reads as follows:

*"Coated glass pane with a low-e and/or solar control coating comprising - in sequence from the glass surface - at least the following layers:*

- *a lower anti-reflection layer, comprising
  - o *a base layer of an (oxi)nitride of silicon having a thickness of at least 8 nm,*
  - o *a middle layer of an oxide of Zn and Sn,*
  - o *a top layer of a metal oxide;**
- *a silver-based functional layer;*
- *a barrier layer;*
- *an upper anti-reflection layer comprising a layer of an (oxi)nitride of aluminium having a thickness of more than 10 nm;*

*wherein the coating is a low-e coating and comprises - in sequence - the following layers:*

*(glass pane /) base layer of SiN<sub>x</sub> 8 - 25 nm / middle layer of ZnSnO<sub>x</sub> 3 - 15 nm / top layer of ZnO (opt.*

*metal-doped) 2 - 10 nm / opt. primer layer  $\leq$  1 nm / Ag-based functional layer 8 - 15 nm / opt. metallic or suboxidic barrier layer  $\leq$  2 nm / barrier layer of ZnO:Al 1 - 5 nm / layer of AlN<sub>x</sub> 15 - 40 nm / protective layer of ZnSnO<sub>x</sub> 2 - 10 nm;*

*wherein the protective layer is the outermost layer of the low-e coating."*

Claims 2 and 3 relate to preferred embodiments.

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

The objections addressed by filing the claim request under consideration had already been raised by the appellant during the opposition proceedings. The respondent had not identified cogent reasons that could justify admitting this request, as would have been required pursuant to Article 13(2) RPBA 2020.

Dependent claims 2 and 3 introduced subject-matter which extended beyond the scope of the application as originally filed. The features of these claims had not been disclosed in conjunction with the subject-matter of the original claim 22, on which claim 1 was based. There was no disclosure corresponding to the original claim 22 in the description. Claims 2 and 3 therefore could not be based on the disclosure on pages 6 and 9 of the original application, respectively. Moreover, the disclosure on page 9 was a combination of features, written as a list of three bullet points, and it was not admissible to extract a single feature from this list.

D4 constituted the closest prior art. D4 disclosed a mechanical protection layer (layer 200). It was known from D7 that an oxide of Zn and Sn was a suitable material for this layer. The ZnO layer of D4 constituted a barrier layer, and it was not excluded that this layer could be Al-doped, as specified for the ZnO wetting layers in D4. The only remaining difference was thus the thickness of the ZnO:Al layer. The patent did not associate this difference with mechanical stability, and in particular did not teach that it ensured that the silver-based layer was sufficiently protected without being too thick, as had been argued by the respondent in their submissions. In the absence of any technical effect, the objective technical problem was merely to provide an alternative. Providing a thickness of 4.5 or 5 nm was a routine choice for the skilled person with regard to D2 (Table 1 and page 9, lines 8-13) and D6 (Examples 2 and 3). The skilled person would not have needed prompting to merely provide an alternative.

- X. The respondent's arguments are reflected in the reasoning below.
  
- XI. The appellant (opponent) requested that the decision under appeal be set aside and that the European patent be revoked.

The respondent (patent proprietor) requested that the patent be maintained on the basis of the sole request, filed as the fourth auxiliary request on 2 September 2020.



## **Reasons for the Decision**

1. Article 13(2) RPBA 2020
  - 1.1 The claim request under consideration was filed in response to the board's preliminary opinion. Claim 1 of this request is the same as that in auxiliary request 6, which was filed with the reply to the statement of grounds of appeal and was first filed during the opposition proceedings.
  - 1.2 The claim request under consideration differs from the former auxiliary request 6 only in that several dependent claims were deleted. Even if this was a response to an objection that could have been addressed earlier, deleting dependent claims in this way does not change the factual and legal framework of this case (T 1480/16, Reasons 2.3; T 995/18, Reasons 2). Moreover, admitting this request promotes procedural economy because it facilitates and focuses the discussion.
  - 1.3 The board is of the opinion that these are exceptional circumstances which justify taking into account this request (Article 13(2) RPBA 2020).
2. Article 123(2) EPC
  - 2.1 Claim 1 is based on the original claim 22 (claim 11 as granted) in conjunction with the paragraph bridging pages 5 and 6 of the description as originally filed.
  - 2.2 The additional features of claims 2 and 3 are those of the original claims 8 and 9 (claims 5 and 6 as granted). The claim structure is such that these

features are not directly linked to the subject-matter of claim 1 at issue (no corresponding back-reference in the original claim 22).

However, the feature of claim 2 (thickness of the protective layer of 3-6 nm) has also been disclosed in the description as originally filed (page 6, paragraph 1). According to this paragraph of the description, the range of 3 to 6 nm is a preferred embodiment of the more general range of 2 to 10 nm, which is the same as the range defined in claim 1. Therefore, there is no doubt that the preferred range of 3 to 6 nm relates to the protective layer also mentioned in the original claim 22, and thus claim 1 at issue.

Claim 3 is based on page 9 of the application as originally filed. This part of the original application relates to the individual partial layers of the lower anti-reflection layer, which are mentioned in the original claim 1 and specified in greater detail in the original claim 22. The feature of claim 3 (thickness of the base layer of the lower anti-reflection layer) has been disclosed in the first bullet point in a list of three bullet points on page 9 as indicated. There was no need to additionally recite the features of the other two bullet points (thickness of the middle layer of the lower anti-reflection layer; thickness of the top layer of the lower anti-reflection layer) in the claim because these features are already present, considering that claim 3 refers directly or indirectly back to claim 1 ("middle layer of ZnSnO<sub>x</sub> 3-15 nm / top layer of ZnO (opt. metal-doped) 2-10 nm").

For these reasons, the subject-matter of claims 2 and 3 is directly and unambiguously derivable from the

application as filed, and the requirements of Article 123(2) EPC are met.

3. Article 56 EPC

3.1 The patent in suit relates to heat treatable coated glass panes with a low-e and/or solar control coating (paragraphs [0001] and [0012]).

3.2 Document D4 is the closest prior art since it also concerns coated glass panes with a low-e and/or solar control coating (page 1, first two paragraphs) which may be subjected to heat treatments (page 8, lines 12-14).

3.3 Example 1 of D4 discloses a specific coating which includes as part of its layer sequence, when viewed from the glass pane, a 10 nm thick second silver functional layer (layer 80), a 2 nm thick titanium layer (layer 85), an 8 nm thick ZnO layer (layer 102) and a 20 nm thick Si<sub>3</sub>N<sub>4</sub> layer (layer 104).

3.4 The problem to be solved by the patent in suit is to improve the mechanical durability whilst maintaining chemical durability (paragraphs [0011]-[0015] and [0019], and the Examples).

3.5 The proposed solution is a coated glass pane in which the part of the layer sequence following the "Ag-based functional layer 8-15 nm" and the "opt. metallic or suboxidic barrier layer ≤ 2nm", when viewed from the glass pane, is as follows: "barrier layer of ZnO:Al (1-5 nm) / layer of AlN<sub>x</sub> 15-40 nm / protective layer of ZnSnO<sub>x</sub> 2-10 nm", the protective layer being the

outermost layer of the low-e coating, as stipulated in claim 1 at issue.

- 3.6 The examples, in particular the results of the brush test in Examples 1 and 3 versus Example 2 of the patent in suit (see Table 5 in paragraph [0103]), show that providing an outermost ZnSnO<sub>x</sub> layer is associated with increased mechanical robustness of the coating, and specifically improved scratch resistance (paragraphs [0024] and [0104] of the patent in suit). This was not under debate.

Furthermore, the claimed layer sequence may be considered a reasonable generalisation of the examples for which the desired chemical and mechanical properties were obtained. It is therefore accepted that the technical problem is solved.

- 3.7 D4 already contemplates the presence of a mechanical protection layer as the outermost layer (Figure 6, reference sign (200) in conjunction with page 16, lines 1-2). Furthermore, D7 proposes providing an outermost protective layer to provide the same effect of preventing scratches; according to one alternative this protective layer may comprise an oxide of Zn and Sn (see claims 1 and 7 and Example 7 of D7).

Even if the skilled person had been motivated by this teaching in the prior art to apply a protective layer comprising an oxide of Zn and Sn to the coating disclosed in Example 1 of D4, this would not have led to the specific layer sequence now claimed. Nor is the only other modification necessary to arrive at the subject-matter of claim 1 an arbitrary reduction in the thickness of the ZnO layer in D4, as set out in the following.

D4 does not mention a barrier layer of ZnO:Al 1-5 nm. The ZnO dielectric layer (102) in Example 1 of D4 does not anticipate this definition of the barrier layer because it is not Al-doped and has a thickness of 8 nm, which is outside the claimed range. There is no basis to conclude that Al-doping of this specific layer would be implicit. By contrast, D4 discloses Al-doping only in the context of the ZnO wetting layers (30, 70), i.e. the layers on which the Ag functional layers are deposited (page 6, lines 19 to 22).

Further modifications to the layer sequence known from D4 would thus have been necessary to also provide the barrier layer of ZnO:Al 1-5 nm and the subsequent layer of AlN<sub>x</sub> 15-40 nm.

ZnO:Al barrier layers having a thickness in the claimed range are known; however, for a convincing argument for lack of inventive step, it is not sufficient to establish that this layer is known as such, but it also needs to be demonstrated that the skilled person would have provided the claimed layer sequence. As can be understood from the examples, the mechanical and chemical properties are those of the coating, which should therefore be seen as a whole.

There is no convincing argument as to why the skilled person would have provided a 1-5 nm thick ZnO:Al barrier layer as part of the coating known from D4.

While ZnO:Al barrier layers having a thickness within the claimed range are known from D2 (page 9, lines 8-13; Table 1), they are disclosed as part of a coating having an outermost protective layer of AlN<sub>x</sub> (2 nm), for instance, this outermost layer being deposited on a

core layer of  $\text{ZnSnO}_x$  (Table 1). Providing a  $\text{ZnSnO}_x$  layer as the core layer of the upper anti-reflection layer is an essential feature of the coating in D2. Furthermore, this known coating has a lower anti-reflection layer comprising, also as an essential feature, a base layer of an (oxi)nitride of aluminium.

In view of these differences between the coatings known from D4 and D2, the skilled person had no reason to assume that the  $\text{ZnO:Al}$  layer in D2 could be included in the coating exemplified in D4.  $\text{ZnSnO}_x$  being the core layer in D2 is incompatible with it being the mechanical protection layer (200) in D4, i.e. the outermost protective layer, and with it being the outermost protective layer taught in D7. Applying the teaching of D2 to D4 would have also entailed providing an (oxi)nitride of aluminium as the base layer of the lower anti-reflection layer, by contrast with claim 1 at issue.

D6 would not have prompted the skilled person to provide a 1-5 nm thick  $\text{ZnO:Al}$  barrier layer either. D6 discloses a 5 nm thick  $\text{ZnO}$  layer intercalated between an Nb layer and an  $\text{Si}_3\text{N}_4$  layer (layer 6 in Examples 2 and 3); however, Al-doping of this  $\text{ZnO}$  layer is not directly and unambiguously disclosed.

To conclude, starting from D4, the skilled person would not have arrived at the claimed coated glass pane in an obvious manner.

3.8 The subject-matter of claim 1 therefore involves an inventive step (Article 56 EPC).

3.9 For the same reasons, the subject-matter of dependent claims 2 and 3 also involves an inventive step.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of claims 1 to 3 of the sole request, filed as the fourth auxiliary request on 2 September 2020, and a description to be adapted thereto.

The Registrar:

The Chairman:



A. Voyé

G. Glod

Decision electronically authenticated