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Datasheet for the decision of 14 June 2012

Case Number: T 1088/09 - 3.3.05

Application Number: 03752625.8

Publication Number: 1542937

IPC: C03C 3/087, C03C 4/02

Language of the proceedings: EN

Title of invention:
Method for making float glass having reduced defect density

Applicant:
PPG Industries Ohio, Inc.

Headword:
Float glass/PPG

Relevant legal provisions:
EPC Art. 54(1)(2), 56, 123(2)

Keyword:
"Inventive step (main request): yes - evidence on file for the success of the solution - technical solution not derivable from the state of the art"

Decisions cited:
-

Catchword:
-

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Case Number: T 1088/09 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 14 June 2012

Appellant: (Applicant)
PPG Industries Ohio, Inc.
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Representative:
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Decision under appeal:
Decision of the Examining Division of the European Patent Office posted 8 December 2008 refusing European patent application No. 03752625.8 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: G. Raths
Members: J.-M. Schwaller
D. Prietzel-Funk

Summary of Facts and Submissions

I. This appeal lies from the decision of the examining division dated 8 December 2008 refusing European patent application No. 03 752 625.8 on the grounds that claim 1 of the main request then on file lacked novelty in the light of the disclosure of document

D2: EP 1 055 646 A1.

In the contested decision, the examining division further held the subject-matter of claim 1 of the first auxiliary request, which reads as follows:

"1. A method for reducing the defect density of glass produced via a float glass process comprising

a. melting a glass composition comprising:

from 65-75 wt. % of SiO_2;

from 10-20 wt. % of Na_2O;

from 5-15 wt. % of CaO;

from 0-5 wt. % of MgO;

from 0-5 wt. % of Al_2O_3;

from 0-5 wt. % of K_2O;

from 0-2 wt. % Fe_2O_3; and

from 0-2 wt. % FeO,

b. pouring the melted glass composition into a tin bath,

wherein the glass composition has a total field strength index of greater than or equal to 1.23 and wherein melting the glass composition yields a glass melt having a water content of at least 0.035 weight percent based on the total weight percent of the composition."

to be novel, but to lack an inventive step in view of the content of document D2 in combination with the common general knowledge that the water content in a melting tank was in most cases above 350 ppm, as confirmed by document

D4: J.T. Brown et al., "*Is your glass full of water ?*", Ceram Eng. Sci. Proc., 17(2), pages 170 to 179 (1996).

II. With the grounds of appeal, the appellant contested the decision of the department of first instance and filed two sets of claims as a main request and as an auxiliary request, respectively. The claims of these requests correspond to those of the respective requests rejected by the examining division.

III. During a telephone conversation on 3 May 2012, the rapporteur of the board informed the appellant that the board held the subject-matter of claim 1 of the main request to lack novelty in the light of the disclosure of document D2, in particular its Examples 1 and 5 and paragraphs [0001], [0002] and [0033].

IV. With letter dated 10 May 2012, the appellant withdrew the pending main request and filed a set of claims corresponding to those of the then pending auxiliary request (see item I. above) as new main (and sole) request.

V. The appellant requested that the contested decision be set aside and that a patent be granted on the basis of the claims according to the main request filed with letter dated 10 May 2012.

Reasons for the Decision

1. *Main request - Allowability of the amendments*

The claims of this request have a basis as follows in the application as filed, published as WO 2004/028990 A1:

– Claim 1 results from the combination of claims 1 and 3 with the passage at page 6, lines 17 and 18;

– Claim 2 corresponds to claim 2 as filed.

It follows that the amended claims of this request meet the requirements of Article 123(2) EPC.

2. *Main request - Novelty*

The board shares the conclusions of the examining division that the claims of this (former auxiliary) request meet the novelty requirement of Article 54 (1) and (2) EPC, in particular over document D2 which discloses a colored glass in which the generation of nickel sulfide stones is eliminated or diminished without impairing glass appearance, with the glass containing 0.5 to 4 wt% total iron oxide in terms of Fe_2O_3 and 0.002 to less than 0.01 wt% molybdenum in terms of Mo (abstract).

D2 is silent as to the water content of the glass melt.

The teaching of document D4 that water is always present in a glass melt does not allow the direct and unambiguous conclusion that a glass melt with a water

content of at least 0.035 wt% is achieved with the glass compositions according to document D2. Therefore the feature related to a glass melt having a water content of at least 0.035 wt% is also not implicitly disclosed by document D2.

3. *Main request - Inventive step*

In accordance with the "problem-solution approach", the board came to the conclusion that the claims at issue meet the requirements of Article 56 EPC for the following reasons:

3.1 The application in suit relates to a method for reducing the defect density of glass produced in a float glass process (page 1, lines 9 to 18 and page 2, lines 6 to 8).

3.2 As to the starting point for assessing inventive step, the board agrees with the examining division that document D2, which also concerns by analogy "a method for reducing the defect density of glass", represents the closest state of the art. D2 in fact addresses the problem of nickel stones generation in glasses, which impair the reliability (and so the quality) of glass products (D2, paragraph [0002]).

3.3 The next step is to define the problem underlying the application in suit. At page 1, line 26 to page 2, line 2 thereof, it is explained that one of the components in the glass melt is water, which diffuses out of the melt and dissociates into hydrogen and oxygen at the glass-tin interface at the stage of the float glass process when the glass melt is poured into

the tin bath. The hydrogen gets trapped at the interface between the molten glass and tin and ultimately impinges on the bottom surface of the glass appearing as small open bottom bubble (SOBB) defects in the bottom surface of the glass article.

The problem underlying the application thus may be seen in the provision of a method for preventing the formation of SOBB at the glass interface of a float glass ribbon on a molten tin bath and so decreasing the SOBB defect density on the glass surface.

3.4 As a solution to this technical problem, the application in suit proposes the method according to claim 1 at issue, which is characterised in particular by the use of a glass composition having a total field strength index of greater than or equal to 1.23 and yielding a water content in the glass melt of at least 0.035 wt.%.

3.5 As to the question whether the above problem has effectively been solved, the technical data (Figure 4 and table 2) attached to the grounds of appeal show that for a glass melt containing more than 0.035 wt. % of water (in Figure 4, H_2O concentrations of 0.045 % and 0.050 % are exemplified) the SOBB defect density is lower with a higher field strength index. Owing to this relationship between the total field strength index of a glass melt and the SOBB defect density in the glass, the board is satisfied that the problem is solved for the glass/melt compositions claimed, i.e. glass compositions having a total field strength index of greater than or equal to 1.23 and a glass melt composition containing more than 0.035 wt. % of water.

3.6 As regards the obviousness of the proposed solution, none of the known state of the art documents addresses the problem of the prevention of the SOBB defects at the glass surface, let alone its solution, namely the selection of a particular range of total field strength index and a glass melt containing more than 0.035 wt. % of water.

In this context - i.e. in the absence of any suggestion in the state of the art of how the above problem might be solved - the skilled person starting from the disclosure of document D2 cannot arrive at the subject-matter of claim 1 at issue without hindsight.

3.7 From the above considerations, the board judges that having regard to the state of the art, the subject-matter of claim 1 at issue is not obvious to a person skilled in the art, and so involves an inventive step within the meaning of Articles 52(1) and 56 EPC.

Claim 2 derives its patentability from claim 1 on which it depends.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of the set of claims 1 and 2 filed on 10 May 2012 and a description to be adapted.

The Registrar: The Chairman

C. Vodz G. Raths