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# Datasheet for the decision of 26 October 2017

**Case Number:** T 1287/13 - 3.2.07

**Application Number:** 97910814.9

**Publication Number:** 0951453

**IPC:** C03B5/08, C03B5/225, C03B5/16, C03B17/06, C03C1/00, G01N27/416

**Language of the proceedings:** EN

**Title of invention:**
METHOD OF FORMING GLASSES

**Patent Proprietor:**
Corning Incorporated

**Opponents:**
Nippon Electric Glass Co., Ltd.
Schott AG

**Headword:**

**Relevant legal provisions:**
EPC Art. 54(1), 56
RPBA Art. 13(3)

**Keyword:**
Late-filed auxiliary requests - admitted (yes)
Inventive step - all requests (no)

**Decisions cited:**

**Catchword:**

Europäisches Patentamt
European Patent Office
Office européen des brevets

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**Case Number: T 1287/13 - 3.2.07**

# D E C I S I O N
## of Technical Board of Appeal 3.2.07
## of 26 October 2017

| | |
|---|---|
| **Appellant III:** (Patent Proprietor) | Corning Incorporated<br>1 Riverfront Plaza<br>Corning, NY 14831 (US) |
| **Representative:** | Kingsbury, Oliver William<br>Elkington and Fife LLP<br>Prospect House<br>8 Pembroke Road<br>Sevenoaks, Kent TN13 1XR (GB) |
| **Appellant I:** (Opponent I) | Nippon Electric Glass Co., Ltd.<br>7-1, Seiran 2-Chome<br>Otsu Shiga 520-8639 (JP) |
| **Representative:** | Tetzner, Michael<br>TETZNER & PARTNER mbB<br>Patent- und Rechtsanwälte<br>Van-Gogh-Strasse 3<br>81479 München (DE) |
| **Appellant II:** (Opponent II) | Schott AG<br>Hattenbergstrasse 10<br>55122 Mainz (DE) |
| **Representative:** | Herden, Andreas F.<br>Blumbach - Zinngrebe<br>PatentConsult<br>Patentanwälte<br>Alexandrastrasse 5<br>65187 Wiesbaden (DE) |
| **Decision under appeal:** | **Interlocutory decision of the Opposition Division of the European Patent Office posted on** |

**8 April 2013 concerning maintenance of European patent No. 0951453 in amended form.**

**Composition of the Board:**

| | |
|---|---|
| **Chairman** | I. Beckedorf |
| **Members:** | G. Patton |
| | V. Bevilacqua |

## Summary of Facts and Submissions

I. Opponent I (appellant I), opponent II (appellant II) and the patent proprietor (appellant III) lodged appeals in the prescribed form and within the prescribed period against the interlocutory decision of the opposition division maintaining European patent No. 0 951 453 in amended form.

II. The opposition of appellant I was based on Article 100(a) EPC (lack of novelty and/or inventive step).

The opposition of appellant II was based on Article 100(a) EPC (lack of novelty and/or inventive step) and Article 100(c) EPC (added subject-matter), its extent being limited to claims 1 to 23 of the patent as granted.

The opposition division held that the then main request and first to fifth auxiliary requests contravened Article 123(2) EPC and that the then sixth auxiliary request fulfilled the requirements of the EPC.

III. In an annex to a summons to oral proceedings, the Board provided its preliminary, non-binding opinion in respect of the requests filed by appellant III. The Board noted that the subject-matter of claims 1 of the main request and of auxiliary requests 1 and 2 filed by letter of 16 August 2013 (auxiliary request 2 corresponding to the patent as upheld by the opposition division) and that of claims 1 of auxiliary requests 3 to 23 filed by letter of 6 January 2014 did not appear to fulfil the requirements of the EPC in view of Article 56 EPC.

IV. Oral proceedings were held on 26 October 2017. For the course of the oral proceedings, the issues discussed with the parties and the parties' initial and final requests, reference is made to the minutes of the oral proceedings.

The present decision was announced at the end of the oral proceedings.

V. Appellant I requested
that the decision under appeal be set aside,
that the patent be revoked, and
that the appeal of appellant III be dismissed.

Appellant II requested
that the decision under appeal be set aside,
that the patent be revoked to the extent that it had been opposed, and
that the appeal of appellant III be dismissed.

Appellant III requested
that the decision under appeal be set aside,
that the patent be maintained in amended form on the basis of one of the sets of claims filed as main request by letter of 16 August 2013 and as new auxiliary request 12 during the oral proceedings.

VI. The following documents from the opposition proceedings are of relevance for the present decision:

O1: J.H. Cowan *et al.*, "An Electrochemical Theory for Oxygen Reboil", *Journal of The American Ceramic Society*, Vol. 49, No. 10, October 1966, pages 559-562
O4: EP 0 607 865 A

VII. Claim 1 of the main request reads as follows:

"A manufacturing process for forming an oxide glass (13) employing a fining or delivery vessel (10) composed of a metal selected from platinum and alloys thereof, said fining or delivery vessel having a vessel wall (12) which separates the inside of the vessel (10) from the atmosphere outside of the vessel, wherein the oxide glass (13) while molten comes into direct contact with the vessel (10) and the partial pressure of hydrogen outside the vessel (10) is controlled relative to the partial pressure of hydrogen inside the vessel (10) to reduce the formation of gaseous inclusions in the region adjacent to the interface between the vessel (10) and the glass (13), said relative control comprising adjusting the partial pressure of hydrogen in the atmosphere outside the vessel wall (12)."

Claim 1 of the new auxiliary request 12 reads as follows (in bold the amendments with respect to claim 1 of the main request; emphasis added by the Board):

"A manufacturing process for forming an oxide glass (13) employing a fining or delivery vessel (10) composed of a metal selected from platinum and alloys thereof, said fining or delivery vessel having a **platinum or platinum alloy** vessel wall (12) which separates the inside of the vessel (10) from the atmosphere outside of the vessel, wherein the oxide glass (13) while molten comes into direct contact with the vessel (10) and the partial pressure of hydrogen outside the vessel (10) is controlled relative to the partial pressure of hydrogen inside the vessel (10) to reduce the formation of gaseous inclusions in the region adjacent to the interface between the vessel (10) and the glass (13), said relative control

comprising adjusting the partial pressure of hydrogen in the atmosphere outside the vessel wall (12) **sufficient to prevent hydrogen from migrating out of the glass and through the platinum or platinum alloy vessel wall, wherein the partial pressure of hydrogen in the atmosphere outside the vessel wall (12) is adjusted in response to the presence of gaseous inclusions in the resultant solidified glass.**"

Hereinafter, the first amendment is referred to as feature (f) and the second amendment as features (g).

VIII. Appellants I and II argued essentially as follows:

*Main request*

O1 disclosed all the features of claim 1 including the use of $H_2O$ or $H_2$ as atmosphere around the vessel in the muffle of figure 1 and the experiments of table I. According to EPO practice, there was no need for an example in the prior art to have actually been performed to regard it as disclosed. This applied in the present case to the list of alternatives given in O1 on page 561, sentence bridging the left- and right-hand columns. Furthermore, said list was given just after mentioning the gases $CO_2$, Ar and $N_2$ which were those that had been successfully applied in experiment 16. The skilled person would immediately consider that the gases of said list were equivalent to the successfully applied ones. Hence, the subject-matter of claim 1 should be considered to be lacking novelty over O1.

Otherwise, the only distinguishing feature of claim 1 of the main request over the plausible closest prior

art O1 was the selection of "hydrogen" for the atmosphere outside the vessel.

Since the technical effect of this distinguishing feature was to reduce the formation of gaseous inclusions, like in O1, the objective technical problem to be solved was merely to provide an alternative solution that could be used in the process of O1 to reduce the formation of gaseous inclusions.

The skilled person would immediately think of trying the gases suggested in O1 itself, including $H_2$, even knowing that it might react explosively in the presence of $O_2$. By doing so, he would arrive at the claimed subject-matter in an obvious manner.

*New auxiliary request 12*

The late-filed new auxiliary request 12 could have been filed earlier such that it should not be admitted into the proceedings.

O1 could be considered to be the plausible closest prior art for claim 1 of the new auxiliary request 12 too. The features (g) introduced in claim 1 were not explicitly disclosed in O1.

However, in view of the technical effect associated therewith, the objective technical problem to be solved remained to provide an **alternative** solution that could be used in the process of O1 to reduce the formation of gaseous inclusions.

When performing the non-inventive step of introducing $H_2$ as atmosphere around the vessel in figure 1 of O1, the skilled person inevitably performed the step of

adjusting the pressure of hydrogen in the atmosphere outside in response to the presence of gaseous inclusions in the resultant solidified glass. Said features did not include any feedback loop in such a way that the claimed process would be continuous or would include a sensor. Hence, the subject-matter of claim 1 of the new auxiliary request 12 should be regarded as lacking inventive step.

IX. Appellant III argued essentially as follows:

*Main request*

The following features of claim 1 were not disclosed by O1:

(a) "manufacturing process";
(b) "fining or delivery vessel";
(c) "hydrogen";
(d) "partial pressure of hydrogen outside the vessel is controlled relative to the partial pressure of hydrogen inside the vessel to reduce the formation of gaseous inclusions"; and
(e) "adjusting the partial pressure of hydrogen in the atmosphere outside the vessel wall".

O1 could not be considered to be the plausible closest prior art since it related to laboratory experiments, not to a manufacturing process as claimed. It was also concerned with a different mechanism from the permeation of $H_2$ via the platinum vessel wall and taught the provision of a blanketing over the surface of the melt, not to control the atmosphere around the vessel as claimed.

The claimed solution of using $H_2$ could not be seen as a mere alternative to the atmospheres used in O1 since $H_2$

was highly reactive, e.g. explosive in the presence of $O_2$. Hence, the skilled person, being aware of this, would certainly not select $H_2$ from the list suggested by O1. The use of $H_2O$ was contrary to the teaching of O1 as it would form $O_2$ which is undesired; it would also require the use of a gas carrier such as air which also contains the undesired $O_2$; or it would lead to the solidification of the surface of the glass melt, which was technically nonsensical. Hence, the skilled person would also certainly not select $H_2O$ from the list suggested by O1. The subject-matter of claim 1 should then be seen as involving an inventive step.

*New auxiliary request 12*

Claim 1 of the new auxiliary request 12 did not lead to any new issues or objections which had not been discussed so far, such that adjournment of the oral proceedings was not required for dealing with the new set of claims. It should hence be admitted into the proceedings.

O1 said nothing about the permeation of $H_2$ through the vessel wall, *a fortiori* about applying an atmosphere of only $H_2$ and raising the (partial) pressure of said $H_2$ in the manner claimed. The features (g) of claim 1 were hence neither disclosed nor suggested in O1.

Should reboil occur with $H_2$, the skilled person had many parameters at his disposal to perform an adjustment. There was no reason for him to select the claimed solution.

Due to the wording "adjusted in response to", claim 1 included a feedback loop such that it implicitly consisted of a continuous process including a sensor,

e.g. for measuring the level of gaseous inclusions and/or the (partial) pressure of the atmosphere.

The problem to be solved should hence be seen as to provide a more flexible manufacturing process for reducing the formation of gaseous inclusions in oxide glasses.

Since such a feedback loop with the corresponding implicit features was not disclosed in O1 nor in any of the available prior art, inventive step should be recognised for the subject-matter of claim 1 of the new auxiliary request 12.

## Reasons for the Decision

1. *Main request*

Since the Board considers that the subject-matter of claim 1 of the main request lacks inventive step (see below), there is no need to discuss in this decision the other objections to this request raised by appellants I and II, which relate to Articles 83, 84, 123(2) and/or 123(3) EPC.

1.1 Novelty

1.1.1 Both appellants I and II contested the novelty of the subject-matter of claim 1 over O1 whereas appellant III referred to a number of features not disclosed in O1 (see point IX above and point 1.1.2 below).

1.1.2 *(a) Feature "manufacturing process"*
As argued by appellants I and II and also expressed in the impugned decision, point 3.7.3, the experiments of O1 described in table I and figure 1 unambiguously

result in the manufacture, i.e. the making, of oxide glass such that said feature cannot be considered as a distinguishing feature over O1.

In particular, contrary to the view of appellant III, the expression "manufacturing process" used in claim 1 neither implies that the process has to be an industrial one, nor that the oxide glass obtained has specific properties, e.g. is ready to be commercialised for flat-panel display devices. In fact, the Board considers that this expression does not include any implicit additional method steps beyond those which are already specified in claim 1. Hence, the fact that, as pointed out by appellant III, it is not disclosed in the method of O1 what happens to the glass once it has been melted is of no relevance since this is also not specified in claim 1 of the main request.

*(b) Feature "fining or delivery vessel"*
Appellant III holds the view that, as a result of the use of a fining or delivery vessel, the claimed method implicitly includes a fining step or a delivery step. For appellant III, since O1 only discloses melting an already well-fined glass in a crucible, fining is not performed in the crucible of O1 and, hence, said crucible cannot be seen as a fining vessel. Further, for appellant III, a delivery vessel is a tube or pipe used for delivering flowing molten glass from one point to another in a glass production process such that delivery is also not performed in O1, and said crucible of O1 cannot be seen as a delivery vessel either. Hence, appellant III considers that O1 does not disclose the feature of claim 1 of a fining or delivery vessel.

The Board cannot share this view for the following reasons given by appellants I and II at the oral proceedings. Even though a "fining or delivery vessel" is mentioned in the claimed method, no such fining and/or delivery steps are actually specified. Therefore, claim 1 encompasses a manufacturing method without such steps. Further, the skilled person will immediately and unambiguously derive that the crucible containing the glass melt in figure 1 of O1 is **suitable for** the transport of said melt. It can hence be seen as a delivery vessel in accordance with claim 1. Contrary to the arguments of appellant III, which are not supported by any evidence, the Board shares the view of appellants I and II that a delivery vessel need not be a tube or a pipe, nor does it mandatorily include structural features which would distinguish it from the crucible used in O1.

In addition, the Board notes - as also pointed out during the oral proceedings - that it is not excluded that the claimed method also be applied to an already well-fined oxide glass (see paragraph [41] of the contested patent), like in O1.

*(c) Feature "hydrogen"*

As pointed out by the parties, O1, page 561, sentence bridging the left- and right-hand columns, refers to neutral or reducing atmospheres such as **$H_2O$**, Ne, **$H_2$** or CO.

This passage relates, however, to a mere **suggestion** that these atmospheres could also prevent reboil since they have not been tested. The skilled person would then derive that these atmospheres still have to be tested in order to check whether they actually prevent reboil. Therefore, the Board finds that appellant III

is right that there is no direct and unambiguous disclosure for the skilled person that these atmospheres would inevitably lead to the effect mentioned in claim 1.

Appellants I and II argued that an example in the prior art did not need to have actually been performed in order to acknowledge it as a disclosed embodiment (see point VIII above). The skilled person, they argued, would read the list of O1, page 561, sentence bridging the left- and right-hand columns, containing $H_2O$, Ne, **$H_2$** and CO, in the context of the explicitly mentioned gases $CO_2$, Ar and $N_2$ which are those that have been successfully applied in experiment 16 with no reboil, and would then immediately consider the gases of said list to be equivalent and therefore disclosed as well as $CO_2$, Ar and $N_2$.

The Board cannot share this view since, as already mentioned above, the skilled person cannot derive directly and unambiguously that the claimed reduction of the formation of gaseous inclusions has actually been disclosed with the suggested atmospheres. On the contrary, doubts are expressed as to whether the claimed effect is to be achieved, in view of the use of the conditional form: "...$H_2O$, Ne, $H_2$ or CO **would** also prevent reboil, but these have **not yet been tested** experimentally" (see page 561, right-hand column, lines 1-2). As a consequence, the suggested atmospheres cannot be seen as being listed as mere alternatives to those which have been disclosed as successful, such as $CO_2$, Ar or $N_2$; see table I, experiment 16 (page 561, left-hand column, last paragraph). A clear distinction is made in O1 between the latter successful atmospheres and the suggested ones. Hence, the disclosure of O1 does not equate to a mere list of alternatives from

which the skilled person would immediately and unambiguously derive that all of them are equivalent with respect to the desired effect.

*(d) Feature "partial pressure of hydrogen outside the vessel is controlled relative to the partial pressure of hydrogen inside the vessel to reduce the formation of gaseous inclusions"*

The Board considers that the expression "inside the vessel" also covers "inside the melt". As a matter of fact, this expression of claim 1 does not specify the **atmosphere inside** the vessel. The expression "atmosphere inside the vessel" is not disclosed in the contested patent. The passages of the description referred to by appellant III (page 6, lines 5-8, and page 6, lines 22-28 of the application as originally filed; paragraph 11, lines 46-48, and paragraph 12, page 3, line 57, to page 4, line 3 of the contested patent) do not disclose the partial pressure of hydrogen of the atmosphere inside the vessel either, but merely refer to "inside the vessel" as claimed. Therefore, the Board shares the view of appellants I and II that the configuration of figure 1 of O1 is not excluded from claim 1. The control of the hydrogen partial pressure outside the vessel relative to the hydrogen partial pressure inside the vessel, i.e. inside the melt, is obtainable with an open-top crucible as described in O1.

The arguments of appellant III that the claimed method would be concerned with the control of the atmosphere at point (C) (see figure below), i.e. outside the vessel, in comparison with O1 which would be concerned with the control of the atmosphere at point (B) is not convincing. As a matter of fact, claim 1 does not specify that the **vessel is closed** as depicted in the

figure below. On the contrary, appellant III argued that the method of claim 1 was to be applied to vessels having "restricted communication" between the outside and the inside. Such "restricted communication" is also not specified in claim 1 and leaves *de facto* any options open with respect to the construction of the vessel. Furthermore, it is clear that in the example of figure 1 of O1 the control of the atmosphere is not limited to point (B), i.e. only above the glass melt in a closed vessel, but rather concerns the complete volume inside the muffle, i.e. also around the vessel (see also point 1.2.1 below).

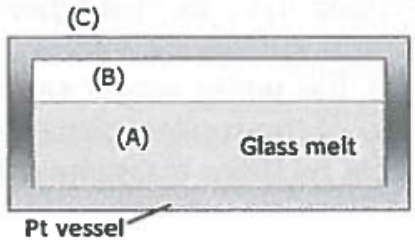


Figure taken from the letter of appellant III of 26 September 2017, page 3.

*(e) Feature "adjusting the partial pressure of hydrogen in the atmosphere outside the vessel wall"*
In view of the above discussion for feature (d), the Board shares the view of appellants I and II that the gas-tight muffle shown in figure 1 of O1 makes it possible to control the atmosphere outside the vessel wall, i.e. to adjust the partial pressure of the gases introduced via the gas inlet tube. Regarding the selection of the gas $H_2$, the arguments given above for feature (c) apply in the same manner to feature (e).

1.1.3 In view of point 1.1.2(c) above, the subject-matter of claim 1 is novel over O1.

1.2 Inventive step

Appellants I and II contested that the subject-matter of claim 1 involves an inventive step in view of O1 alone and/or in combination with the skilled person's common general knowledge.

1.2.1 Closest prior art

Appellant III argued that the teaching of O1 concerns mere laboratory experiments, i.e. not a manufacturing process as claimed, for the reduction of bubble formation in a galvanic cell by removing $O_2$ from the atmosphere over the melt (see the abstract, in particular point 2; page 559, "I. Introduction"; page 560, left-hand column; figure 2). Its teaching would hence be merely to provide a **blanketing** over the surface of the melt, not to control the atmosphere around the vessel as claimed. In view of this, appellant III held the view that the authors of O1 used a muffle in figure 1 of O1 merely for convenience, not intentionally to control the atmosphere around the crucible as in claim 1. Further, for appellant III, the **mechanisms** underlying the disclosed and claimed methods would **not be comparable**. In O1 the formation of bubbles was related to a galvanic mechanism with a transfer of electrons from an anode to a cathode, in which the presence of $O_2$ over the melt plays an essential role. In the method of claim 1 the mechanism was related to the dissociation of OH groups dissolved in the glass into neutral hydrogen and oxygen, leading to the migration of $H_2$ via the platinum vessel wall (contested patent, paragraph [21]). As a result, appellant III considers that O1 cannot be regarded as representing the closest prior art. O4 instead should be taken as the closest prior art for assessing inventive step as

it is directed to a manufacturing process, using the fining agents arsenic and/or antimony to be avoided for environmental issues (see contested patent, paragraphs [9] and [10]).

The Board cannot share this view since, like claim 1 of the main request, O1 lies in the technical field of manufacturing oxide glasses and aims at reducing the gaseous inclusions in the melt. The fact that O1 may be concerned with blanketing does not change the fact that it discloses experiments (see table I and figure 1) in which the complete atmosphere around the vessel is controlled as claimed. The fact that the mechanisms mentioned are different does not remove the fact that the ultimate goal of reducing the formation of oxygen blisters, i.e. gaseous inclusions, in the melt is the same in O1 and in the contested patent. Finally, as already discussed in point 1.1.2(a) above, the experiments of O1 fall within the broad interpretation of the feature "manufacturing process".

Hence, O1 is regarded as a **plausible** closest prior art. The fact that O4 could also possibly be considered to be a plausible closest prior art does not change this fact.

1.2.2 Disclosure of O1

O1 discloses a manufacturing process (see discussion under point 1.1.2(a) above) for forming an oxide glass of the composition: 20% $Na_2O$, 20% $Al_2O_3$, 50% $SiO_2$ and 10% $P_2O_5$, employing a vessel ("crucible") suitable for transporting the glass (see discussion under point 1.1.2(b) above), composed of platinum, said vessel having a vessel wall which separates the inside of the vessel from the atmosphere outside of the vessel,

whereby the oxide glass while molten comes into direct contact with the vessel, and the partial pressure of gases such as $CO_2$, Ar or $N_2$ outside the vessel is controlled relative to the partial pressure inside the vessel (see discussion under point 1.1.2(d) above) to reduce the formation of gaseous inclusions in the region adjacent to the interface between the vessel and the glass (see abstract, "...oxygen reboils, which occurs at a platinum-glass interface..."), said relative control comprising adjusting the partial pressure of said gases in the atmosphere outside the vessel wall (see discussion under point 1.1.2(e) above; page 559, part "III. Experimental Arrangements and Results"; table I, in particular experiments 15 and 16; figure 1).

1.2.3 Distinguishing features

As a result, the only distinguishing feature of claim 1 of the main request over O1 is the selection of "hydrogen" for the atmosphere outside the vessel (see point 1.1.2(c) above).

1.2.4 Technical effect

The technical effect of this distinguishing feature is to reduce the formation of gaseous inclusions (see contested patent, paragraph [11]).

This effect is in fact already obtained by experiments shown in table I of O1 ("no reboil"); see for instance experiment 16.

1.2.5 Problem to be solved

Therefore, the Board concurs with the finding in the impugned decision, point 3.7.4.1, that the objective technical problem to be solved is to be seen as providing an **alternative** solution to be used in the process of O1 to reduce the formation of gaseous inclusions.

1.2.6 Inventiveness

Although failing to propose any reformulation of the above-mentioned problem, appellant III considered that the claimed solution ($H_2$) could not be seen as a mere alternative to the atmospheres applied in the examples of table I and figure 1 of O1. For appellant III, the skilled person was fully aware that $H_2$ was an explosive gas in the presence of $O_2$ and, hence, even if he could, he would certainly not have selected it from the suggested list of O1, page 561, sentence bridging the left- and right-hand columns.

Regarding $H_2O$, appellant III held the view that the skilled person would not have thought of using it in the embodiments of O1 - even if suggested - since this would run contrary to the very teaching of O1 itself. That was because the skilled person would have realised that he would run the risk of forming $O_2$ by the dissociation of water, which was undesired in the atmosphere of O1. Further, introducing $H_2O$ on the top of the glass melt would have led to the solidification of the surface of the glass which would have been technically nonsensical for the skilled person. Finally, $H_2O$ would have to be introduced with a gas carrier, i.e. air, the latter comprising the undesired $O_2$. Therefore, for these reasons, even if he could, the skilled person would not have selected $H_2O$ from the suggested list of O1.

Appellant III considered that the skilled person would instead select Ne from the suggested list since it is an inert gas which is safe (non-explosive) and not contrary to the teaching of O1 (no formation of $O_2$).

The Board cannot share this view for the reasons provided by appellants I and II. As a matter of fact, O1 itself suggests (page 561, sentence bridging the left- and right-hand columns) testing $H_2$ as one of a total of four possible alternatives, i.e. a shortlist. As a consequence, faced with the above problem, the skilled person would immediately have thought of trying said proposed atmosphere and, hence, would have arrived at the claimed subject-matter in an obvious manner (Article 56 EPC).

The Board agrees with appellant III that the skilled person is aware that $H_2$ is a highly reactive gas, e.g. possibly explosive in the presence of $O_2$. However appellant III did not contest that this property would not preclude $H_2$ from being used in the glass industry. As a matter of fact, the skilled person knows the measures to take for its safe handling. Hence, the Board cannot see any reason not to use $H_2$ as atmosphere in the experiments of table I and figure 1 of O1. As pointed out by appellants I and II, had the authors of O1 thought of any reason not to use $H_2$, they would not have themselves suggested it.

Since the Board is convinced that the skilled person would have tried at least $H_2$, there is no need to discuss the use of $H_2O$ too.

2. *New auxiliary request 12*

2.1 Admissibility

2.1.1 The new auxiliary request 12 was filed during the oral proceedings before the Board.

2.1.2 Appellants I and II objected to its admission into the proceedings arguing, firstly, that many auxiliary requests had already been filed in the course of the appeal proceedings and, secondly, that appellant III could have reacted earlier to the Board's negative preliminary opinion provided in the annex to the summons. There was therefore no valid reason for filing the new auxiliary request 12 that late.

2.1.3 The Board, in exercising its discretion under Article 13(3) RPBA, decided to admit the new auxiliary request 12 into the appeal proceedings because, as argued by appellant III, claim 1 of the new auxiliary request 12 results from a straightforward combination of claims 1 and 2 of the former, withdrawn auxiliary request 12 and does not lead to any new issues or objections which have not been discussed so far or which the Board or appellants I or II could not reasonably be expected to deal with without adjournment of the oral proceedings.

2.2 Inventive step

Since the Board considers that the subject-matter of claim 1 of the new auxiliary request 12 lacks inventive step (see below), there is no need to discuss in this decision the other objections raised by appellants I and II to this request which would have resulted from the amendments made to claim 1 (see point VII above).

2.2.1 Closest prior art

O1 can be considered to be a plausible closest prior art for claim 1 of the new auxiliary request 12 for the same reasons as those given under point 1.2.1 above.

2.2.2 Disclosure of O1

As is undisputed by the parties, O1 discloses that the vessel has a platinum or platinum alloy vessel wall (feature (f); see for instance page 559, "III. Experimental Arrangements and Results"; crucible material in experiments 15 and 16 of table I; figure 1).

Regarding the features (g) (see point VII above), the Board notes that it was not contested that they are not disclosed in O1.

2.2.3 Distinguishing features

As a consequence, features (g) represent further distinguishing features in addition to the one ($H_2$) identified for claim 1 of the main request (see point 1.2.3 above).

2.2.4 Technical effect

The technical effect of the distinguishing features (g) is the same as that of the distinguishing feature $H_2$, namely to reduce the formation of gaseous inclusions (see point 1.2.4 above).

2.2.5 Problem to be solved

As a result, the objective technical problem to be solved also remains to provide an **alternative** solution to be used in the process of O1 to reduce the formation of gaseous inclusions.

2.2.6 Inventiveness

As already discussed for the main request, applying an atmosphere of $H_2$, i.e. an atmosphere consisting of hydrogen only, in figure 1 and the experiments of table I of O1, such as experiment 16, is not considered to involve an inventive step.

As argued by appellants I and II, the skilled person trying in a non-inventive manner an atmosphere of only $H_2$ already falls within the broad interpretation of said features (g).

Indeed, by doing so, either he is immediately successful - i.e. the (partial) pressure of $H_2$ is already high enough to avoid reboil in view of the glass treated - or he is faced with reboil.

The former case (no reboil) occurs inevitably when introducing, as suggested, only $H_2$ instead of $CO_2$, Ar or $N_2$ in experiment 16, for instance, for glasses with a low level of $H_2$ in the melt. In this respect, as pointed out during the oral proceedings, claim 1 covers all oxide glasses, including those with a low level of $H_2$ in the melt for which also a low pressure outside the vessel is sufficient to avoid reboil. As argued by appellants I and II, the introduction of $H_2$ itself amounts to adjusting the pressure of $H_2$ in the atmosphere outside the vessel.

In the latter case (reboil), the skilled person striving to avoid reboil with the suggested alternative $H_2$ and using his common general knowledge has at his disposal parameters to adjust, including the atmospheric pressure. By doing so, he will arrive after a few trials at the sufficient pressure as claimed.

In both cases discussed above, hydrogen will **inevitably** be prevented from migrating out of the glass and through the platinum or platinum alloy vessel as no reboil is achieved. Furthermore, the partial pressure of hydrogen in the atmosphere outside is also adjusted **in response to** the presence of gaseous inclusions in the resultant solidified glass.

2.2.7 In respect of the arguments submitted by appellant III to the effect that the subject-matter of claim 1 according to the new auxiliary request 12 involves an inventive step (see point IX above), the Board finds that the skilled person does not need to be aware of the permeation of $H_2$ through the vessel wall (which is a phenomenon related to the physics occurring in the melt) in order to test an atmosphere of $H_2$ for avoiding reboil and reducing the formation of gaseous inclusions in the glass, because this is something which is explicitly taught in O1.

Although appellant III is right in that the skilled person would have several parameters at his disposal to adjust when striving to avoid reboil, the Board, agreeing with appellants I and II, is of the opinion that the (partial) pressure of the atmosphere is the most straightforward parameter that a skilled person would be aware of, in particular as he knows from O1 that the atmosphere plays an important role on reboil.

In addition, selecting an obvious parameter from a list of obvious parameters does not render said parameter non-obvious (see Case Law of the Boards of Appeal, 8th edition 2016, I.D.9.18.7).

Contrary to the view of appellant III, and as discussed at the oral proceedings, the claimed process cannot be seen as a continuous process in particular in view of the fact that the evaluation of the presence of gaseous inclusions is done "in the resultant **solidified** glass", i.e. not in the glass melt when reboil occurs but rather at the end of the process after solidification. A sensor is hence also not implicitly part of the claimed manufacturing process.

2.2.8 As a consequence, the skilled person starting from O1 and using his common general knowledge will arrive at the claimed subject-matter in an obvious manner (Article 56 EPC).

**Order**

**For these reasons it is decided that:**

1. The appeal of appellant III (patent proprietor) is dismissed.

2. The decision under appeal is set aside.

3. The patent is revoked.

The Registrar: The Chairman:

G. Nachtigall I. Beckedorf

Decision electronically authenticated