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Datasheet for the decision of 14 February 2023

Case Number: T 0890/21 - 3.3.05

Application Number: 10717896.4

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Language of the proceedings: EN

Title of invention:
VACUUM INSULATING GLASS UNIT INCLUDING INFRARED MELTABLE GLASS FRIT, AND/OR METHOD OF MAKING THE SAME

Patent Proprietor:
Guardian Glass, LLC

Opponent:
AGC Glass Europe

Headword:
Glass frit/Guardian

Relevant legal provisions:
EPC Art. 56
RPBA 2020 Art. 12(4)

Keyword:
Inventive step - main request (no)
Amendment to case - amendment admitted (no)

Decisions cited:
T 0939/92, T 2920/18, T 2295/19

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 0890/21 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 14 February 2023

Appellant: (Opponent)	AGC Glass Europe Avenue Jean Monnet 4 1348 Louvain-la-Neuve (BE)
Representative:	Gill Jennings & Every LLP The Broadgate Tower 20 Primrose Street London EC2A 2ES (GB)
Respondent: (Patent Proprietor)	Guardian Glass, LLC 2300 Harmon Road Auburn Hills MI 48326 (US)
Representative:	Hoyng Rokh Monegier B.V. Rembrandt Tower, 30th Floor Amstelplein 1 1096 HA Amsterdam (NL)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 10 May 2021 rejecting the opposition filed against European patent No. 2424822 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	G. Glod
	O. Loizou

Summary of Facts and Submissions

I. The opponent's (appellant's) appeal lies from the opposition division's decision rejecting the opposition against European patent No. B-2 424 822.

II. The following documents cited in the impugned decision are of relevance here:

D3: M.B. Volf, "Chemical Approach to Glass", Glass Science and Technology 7, 1984, pages 347 to 359
D5: WO 02/27135 A1
D9: Technical report, submitted by the opponent on 11 October 2019

III. Claim 1 of the impugned patent reads as follows:

"*1. A vacuum insulating glass (VIG) intermediate assembly, comprising:*
first and second substantially parallel spaced-apart glass substrates, wherein the first and second substrates each include one or more edge portions to be sealed; and
a glass frit provided at least partially between the first and second glass substrates for sealing said one or more edge portions to be sealed,
wherein the glass frit has a glass redox (FeO/Fe_2O_3) that is higher than a glass redox (FeO/Fe_2O_3) of the first and second substrates."

IV. With the reply to the statement of grounds of appeal, the respondent (patent proprietor) filed, among other requests, auxiliary request 8, claim 1 of which corresponds to claim 6 as granted and reads as follows:

"*1. A method of making a vacuum insulating glass (VIG) unit, the method comprising:*
providing first and second substantially parallel spaced-apart glass substrates, the first and second substrates each including one or more edge portions to be sealed, a glass frit being provided at least partially between the first and second glass substrates for sealing said one or more edge portions to be sealed; and
irradiating infrared energy from one or more infrared energy sources towards the one or more edge portions to be sealed in forming an edge seal of the VIG unit, wherein the glass frit has a glass redox (FeO/Fe_2O_3) that is higher than a glass redox (FeO/Fe_2O_3) of the first and second substrates."

V. The respondent's arguments relevant to the present decision can be summarised as follows.

D5 did not disclose that the glass frit contained any iron. The glass redox parameter in claim 1 of the patent in suit implied that some FeO was present in the glass frit. This presence, regardless of its amount, allowed for better IR (infrared) absorbance. Furthermore, the use of IR radiation was safer than microwaves and less costly and could provide better compatibility between glass substrate and glass frit. These technical effects had to be taken into consideration when formulating the objective technical problem over D5. No prior art taught the inclusion of FeO in the glass frit and the benefits of IR.

Auxiliary request 8 was a reaction to the grounds of appeal. But in any case, it could not be considered an amendment to the proprietor's case since the process

claims had been dealt with in the impugned decision. It was evident from paragraphs 158 to 258 of the reply to the appeal why the process was inventive. During oral proceedings before the opposition division, the opposition division for the first time took the position that the closest prior art might be different for claims 1 and 6.

VI. The appellant's arguments are reflected in the reasoning below.

VII. At the end of the oral proceedings, which took place on 14 February 2023 and during which the respondent withdrew all auxiliary requests then on file apart from auxiliary request 8, the final requests of the parties were as follows.

The appellant (opponent) requested that the impugned decision be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request) or, alternatively, that the patent be maintained in amended form on the basis of auxiliary request 8 submitted with the reply to the statement of grounds of appeal.

Reasons for the Decision

Main request

1. Article 56 EPC

1.1 The invention relates to vacuum insulating glass.

1.2 D5 is considered to be the closest prior art since it also relates to a vacuum insulating glass unit made by

providing first and second substrates with a plurality of spacers between the substrates and forming a hermetic peripheral or edge seal at least partially between the first and second substrates using at least microwave energy (page 6, lines 1 to 7 and impugned decision point 17.3.1). Although the presence of iron in such glass is highly likely, it is accepted to the respondent's benefit that D5 is silent about iron being present in the glass substrate and glass frit.

1.3 The problem to be solved is to reduce the time in which the glass frit melts (paragraphs [0001] and [0016]).

1.4 The problem is allegedly solved by an assembly according to claim 1 characterised in that the glass frit has a glass redox (FeO/Fe_2O_3) that is higher than the glass redox (FeO/Fe_2O_3) of the first and second substrates.

1.5 The problem has not been solved successfully by the claimed subject-matter since the exposure time mentioned in D5 (see page 16, lines 25 to 27) is also very short and there is no evidence that the assembly claimed is any better than the one of D5.

1.6 Therefore, the problem needs to be redefined. The respondent considered that the problem to be solved was to provide a glass assembly which allows for a better and safer method for melt-sealing.

1.7 The board is not convinced that this problem is solved over the whole range claimed. Even if it is accepted that the inclusion of ferrous iron in the glass frit would imply a higher concentration of ferrous irons in the glass frit than in the glass substrate in view of the accepted absence of iron in the glass substrate of

D5, the board agrees with the appellant that melt-sealing via IR requires a minimum concentration of FeO. This is confirmed by paragraphs [0019], [0028] and [0029] of the impugned patent. The respondent, having alleged this advantage, has not provided any evidence that a very low concentration of FeO in the frit allows obtaining as decent a melt-sealing as obtained in D5 with microwave.

1.8 Therefore, the problem needs to be redefined in less ambitious terms and can be seen as the provision of an alternative vacuum insulating glass assembly.

1.9 The solution to this problem is obvious.

1.9.1 It is evident from the patent in suit that the comparison of the glass redox of the glass frit with the upper and lower glass substrates does not have a technical effect and cannot be associated with the heating by IR over the whole scope claimed. Such an effect is only linked to the amount of FeO (see patent: page 2, lines 6 and 7; page 3, lines 28 and 29; page 4, line 40). This conclusion is confirmed by D9 (graphs on page 3) and is not contradicted by other evidence. Therefore, as indicated above, the effect caused by the IR source is not linked to the parameter claimed but to a minimum amount of FeO. The parameter is arbitrary.

1.9.2 The presence of ferrous iron in the glass frit is an obvious option for two reasons.

Firstly, D5 does not emphasise the iron content of the glass substrate or the glass frit. Therefore, the skilled person implementing the invention of D5 would regard the use of a glass frit containing iron as one possible choice since iron is present in many glasses

(see D3, page 354, last heading). If iron is present in glass, ferric and ferrous iron exist side by side (see D3, page 349, first paragraph below figure). Consequently, the parameter is considered an arbitrary choice between the limited numbers of possible choices for glass redox.

Secondly, the skilled person learns from D5 that the process is not limited to microwave energy (see, for example, page 6, line 7 "*at least microwave energy*"). This is confirmed on page 21, line 12 ("*any other suitable energy*") and by the indications of wavelength given on page 15, line 21, which includes 1 mm. This wavelength is also considered to belong to IR. The preferred option of D5 is certainly microwave energy with dopants (see page 13, line 27 to page 14, line 9), but D5 is not restricted to such a narrow teaching. The skilled person trying to find an alternative has plenty of options, including replacing or supplementing the preferred option with other types of energy. Since the wavelength of IR is already mentioned, albeit only in the far IR range, it is accepted that the skilled person would consider IR to be one possible energy form for solving the posed problem. The skilled person trying to solve the not very ambitious problem would consider IR to be a possible energy source.

D5 also teaches the use of dopants which improve absorption of the used energy source. The skilled person using IR energy based on the general teaching of D5 also knows that FeO is one possible dopant in the IR range since it is known to absorb in the IR range (see D3, page 348, first full paragraph). Therefore, they would try to add it to the glass frit when solving the not very ambitious problem and arrive at the claimed subject-matter.

It is recognised that the skilled person has many options based on D5's general teaching. However, it is accepted case law that a mere arbitrary choice from a host of possible solutions cannot involve an inventive step (Case Law of the Boards of Appeal of the EPO, 10th edn., 2022, I.D.9.21.9 a) and T 939/92, Reasons 2.5.3).

1.10 The requirements of Article 56 EPC are not met, and the main request must fail.

Auxiliary request 8

2. Article 12(4) RPBA 2020

This request was submitted in reply to the appellant's statement of grounds of appeal. Claims 1 to 8 correspond to claims 6 to 13 as granted, meaning that the product claims have been deleted.

Under Article 12(4) RPBA 2020, third sentence, "*the party shall clearly identify each amendment and provide reasons for submitting it in the appeal proceedings. In the case of an amendment to a patent application or patent, the party shall also indicate the basis for the amendment in the application as filed and provide reasons why the amendment overcomes the objections raised*".

The board is aware of the case law indicating that the deletion of product claims might possibly not be considered an amendment - albeit under Article 13(2) RPBA 2020 (see for example T 2295/19 (Reasons 3.4.1) and T 2920/18 (Reasons 3.6.1)) - but considers that this reasoning does not apply in the current case. The method claims did not refer back to claim 1 in the

patent in suit. This implies that different questions may have to be addressed, also illustrated by the fact that in the impugned decision different closest prior arts were used for the subject-matter of claims 1 and 6 (see Reasons 17.3.1 and 17.3.2). Although the decision evidently dealt with all independent claims, a request containing only the process claims is a new case in the situation where the product claim was not considered to be inventive and the process claims need to be analysed to find out whether the further features present in the claim could overcome the inventive-step objection against the product claim.

In the case at hand, the respondent has not provided any reasons why the objections raised by the appellant would be overcome by the method claims.

Even if it is accepted that the objection against claim 6 based on a different closest prior art than against claim 1 were raised for the first time during oral proceedings before the opposition division, this would relate to Article 12(6) RPBA 2020 and the time of submission. It is irrelevant for the question of whether the request is reasoned as required by Article 12(4) RPBA, which would, as indicated above, still not be met.

Even if the current request were considered an appropriate reaction to the grounds of appeal, the reply still needs to be reasoned to explain why this request should be allowable, while the main request is not. The reasoning should allow the board and the other party to understand why objections raised against the main request would be overcome by the new request containing only the process claims. Paragraphs 158 to 258 of the respondent's reply do not make a distinction

between claims 1 and 6. They imply that if the respondent's arguments were not be convincing for claim 1, they would not be for claim 6 either. Paragraph 274 of this reply on auxiliary request 8 only indicates that claims 1 to 5 of the main request were removed.

Consequently, the reply does not contain any reasons why the amendment overcomes the objections succeeding against claim 1, nor can the board see any. Although the amendment is not complex, the board cannot recognise the suitability of the amendment for addressing the issue of inventive step. Therefore, the request is not admitted into the appeal proceedings.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

K. Götz-Wein E. Bendl

Decision electronically authenticated