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**Datasheet for the decision
of 6 February 2026**

Case Number: T 0723/24 - 3.3.05

Application Number: 15771328.0

Publication Number: 3191421

IPC: C03C3/087, C03C3/095,
C03C3/097, C03C13/06, C03B37/00

Language of the proceedings: EN

Title of invention:
GLASS COMPOSITIONS, FIBERIZABLE GLASS COMPOSITIONS, AND GLASS
FIBERS MADE THEREFROM

Patent Proprietor:
Electric Glass Fiber America, LLC

Opponent:
Owens Corning Intellectual Capital, LLC

Headword:
Fiberisable glass compositions/Electric Glass Fiber America

Relevant legal provisions:
EPC Art. 56, 123(2)
RPBA 2020 Art. 12(4), 12(6)

Keyword:

Inventive step (no) - improvement not credible - obvious
alternative
Amendments - allowable (no) (auxiliary requests 1A-24A)
Objection not admitted in opposition proceedings -
circumstances of appeal case justify admittance (yes)
Amendment to case - suitability of amendment to address issues
(no)

Decisions cited:

G 0002/21, T 1984/15

Catchword:



Beschwerdekammern

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Case Number: T 0723/24 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 6 February 2026

Appellant 1: Electric Glass Fiber America, LLC
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
10 May 2024 concerning maintenance of the
European Patent No. 3191421 in amended form.**

Composition of the Board:

Chairman T. Burkhardt
Members: S. Besselmann
O. Loizou

Summary of Facts and Submissions

I. The appeals in this case, by the patent proprietor (appellant 1) and the opponent (appellant 2), are against the opposition division's interlocutory decision according to which European patent EP 3 191 421 B1 in amended form on the basis of auxiliary request 1 met the requirements of the EPC.

II. The patent in suit concerns glass compositions, fiberisable glass compositions and glass fibres made from these compositions.

III. Claim 1 of auxiliary request 1 reads as follows.

"A glass composition suitable for fiber forming comprising:

SiO₂ 56-68 weight percent

Al₂O₃ 11 to less than 20 weight percent;

CaO less than 5 weight percent;

MgO between 10 and 16 weight percent;

Na₂O 0-1 weight percent;

K₂O 0-1 weight percent;

Li₂O 0-5 weight percent;

TiO₂ 0-2 weight percent;

B₂O₃ 0-3 weight percent;

Fe₂O₃ 0-1 weight percent;

SnO₂ 0-4 weight percent;

ZnO is present in an amount up to 4 weight percent;

at least one rare earth oxide in an amount not less than 0.05 weight percent; and

other constituents 0-11 weight percent total."

Compared with claim 1 of the patent as granted (main request), the range of the CaO is more limited. In

claim 1 of the patent as granted, it was "CaO 12 weight percent or less".

Claim 1 of auxiliary request 2 differs from that of auxiliary request 1 in that the following feature is added at the end of the claim:

" , wherein the at least one rare earth oxide comprises at least one of La₂O₃, Y₂O₃, Sc₂O₃, Nd₂O₃, Sm₂O₃, and Gd₂O₃"

Claim 1 of auxiliary request 3 differs from that of auxiliary request 1 in that the amount of the at least one rare earth oxide is at least 1 weight percent.

Claim 1 of auxiliary request 4 combines the amendments of auxiliary requests 2 and 3.

Claim 1 of auxiliary request 5 differs from that of auxiliary request 4 in that the amount of SiO₂ is 60 to 68 weight percent.

Claim 1 of auxiliary request 6 differs from that of auxiliary request 5 in that the following feature is added at the end of the claim:

" , and wherein the composition is substantially free of B₂O₃", along with the deletion of the feature
"B₂O₃ 0-3 weight percent;"

Claim 1 of auxiliary request 7 differs from that of auxiliary request 3 in that the ranges for SiO₂, Al₂O₃ and Li₂O are instead as follows:

"SiO₂ 60-68 weight percent;"
"Al₂O₃ 14-19 weight percent;"
"Li₂O 0-2 weight percent;"

Claim 1 of auxiliary request 8 differs from that of auxiliary request 7 in that the following feature is added at the end of the claim (as in auxiliary request 2):

" , wherein the at least one rare earth oxide comprises at least one of La_2O_3 , Y_2O_3 , Sc_2O_3 , Nd_2O_3 , Sm_2O_3 , and Gd_2O_3 "

Claim 1 of auxiliary request 9 differs from that of auxiliary request 7 in that the range for Li_2O is instead:

" Li_2O between 0.4 and 2 weight percent;"

Claim 1 of auxiliary request 10 differs from that of auxiliary request 9 in that the following feature is added at the end of the claim:

" , wherein the $\text{Na}_2\text{O} + \text{K}_2\text{O}$ content is less than 0.5 weight percent"

Claim 1 of auxiliary request 11 differs from that of auxiliary request 10 in that the following feature is added at the end of the claim:

" , and wherein the composition is substantially free of B_2O_3 "

along with the deletion of the feature:

" B_2O_3 0-3 weight percent;" (as in auxiliary request 6)

Claim 1 of auxiliary request 12 differs from that of auxiliary request 9 in that the following feature is added at the end of the claim (as in auxiliary request 2):

" , wherein the at least one rare earth oxide comprises at least one of La_2O_3 , Y_2O_3 , Sc_2O_3 , Nd_2O_3 , Sm_2O_3 , and Gd_2O_3 "

In claim 1 of auxiliary request 13, the amendments of auxiliary requests 10 and 12 are combined.

In claim 1 of auxiliary request 14, the amendments of auxiliary requests 11 and 12 are combined.

Claim 1 of auxiliary request 15 differs from that of auxiliary request 10 in that the amount of the at least one rare earth oxide is between 1 and 8 weight percent.

Claim 1 of auxiliary request 16 differs from that of auxiliary request 10 in that the amount of the at least one rare earth oxide is between 3 and 8 weight percent

Claim 1 of auxiliary requests 17 and 18 differs from that of auxiliary requests 15 and 16, respectively, in that the following feature is added at the end of the claim (as in auxiliary request 2):

" , and wherein the at least one rare earth oxide comprises at least one of La_2O_3 , Y_2O_3 , Sc_2O_3 , Nd_2O_3 , Sm_2O_3 , and Gd_2O_3 "

Claim 1 of auxiliary requests 19 and 20 differs from that of auxiliary requests 17 and 18, respectively, in that Y_2O_3 has been deleted from the list of rare earth oxides.

Claim 1 of auxiliary requests 21 and 22 differs from that of auxiliary requests 19 and 20, respectively, in that the list of rare earth oxides has been amended to the following feature: *"wherein the at least one rare earth oxide comprises La_2O_3 "*

Claim 1 of auxiliary requests 23 and 24 differs from that of auxiliary requests 21 and 22 in that the following feature is added at the end of the claim (as

in auxiliary request 6):

" , and wherein the composition is substantially free of B₂O₃ ", along with the deletion of the feature "B₂O₃ 0-3 weight percent ;"

In summary, claim 1 of auxiliary request 24 reads as follows:

"A glass composition suitable for fiber forming comprising:

SiO₂ 60-68 weight percent;

Al₂O₃ 14-19 weight percent;

CaO 5 weight percent or less;

MgO between 10 and 16 weight percent;

Na₂O 0-1 weight percent;

K₂O 0-1 weight percent;

Li₂O 0.4--2 weight percent;

TiO₂ 0-2 weight percent;

Fe₂O₃ 0-1 weight percent;

SnO₂ 0-4 weight percent;

ZnO is present in an amount up to 4 weight percent;

at least one rare earth oxide in an amount between 3 and 8 weight percent; and

other constituents 0-11 weight percent total,

wherein the Na₂O + K₂O content is less than 0.5 weight percent,

wherein the at least one rare earth oxide comprises La₂O₃, and

wherein the composition is substantially free of B₂O₃."

Claim 1 of auxiliary requests 1A to 24A differs from that of auxiliary requests 1 to 24, respectively, in that the feature regarding SnO₂ has been amended to the following:

"SnO₂ is present in an amount up to 4 weight percent"

Auxiliary requests 3' to 14' and 3A' to 14A' differ from auxiliary requests 3 to 14 and 3A to 14A, respectively, in that the amount of rare earth oxide in claim 1 has been defined more narrowly to read "*at least one rare earth oxide in an amount of greater than 3 weight percent*".

IV. The following documents are relevant:

- D4 WO 2015/009686 A
- D5 Wallenberger et al., "Glass fibers",
ASM Handbook, Vol. 21: Composites, 2001
- D8 CN 104591541 A
- D11 CN 103086605 A
- D11a English machine translation of D11
- D12 JP 2011-105554 A
- D12a English machine translation of D12

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

The inventive-step objection starting from D11 should not be taken into consideration. Even if it were considered, the subject-matter of claim 1 of auxiliary request 1 was not obvious. The claimed compositions solved the technical problem of improving the mechanical properties and the thermal resistance. Even with a less ambitious technical problem, it would not have been obvious to add ZnO to the compositions known from D11. The same reasoning applied to the main request.

Claim 1 of auxiliary request 24 solved the technical problem of providing a glass composition with favourable fiberisation properties which could be formed into fibres at low cost and which had good heat

resistance and a very good fibre modulus, superior to that of known S-glass. The claimed solution would not have been obvious starting from D11 because a number of modifications would be required. Moreover, even if the skilled person applied these modifications to the examples of D11, they would not arrive at a composition within the scope of the claim.

Claim 1 of each of auxiliary requests 2 to 23 was less specific than claim 1 of auxiliary request 24.

The opponent's objection under Article 123(2) EPC against the A versions of the auxiliary requests should not be taken into account because it should have been raised against the patent as granted. Moreover, it was derivable from the claims as filed that SnO₂ and ZnO could be present in combination. The requirements of Article 123(2) EPC were met.

The prime versions of the auxiliary requests should be taken into account as a reaction to the opponent's submission of 9 February 2024. The requests provided a further distinction from D11 without bringing new aspects into the discussion.

- VI. The opponent's arguments are reflected in the reasons for the decision.

- VII. The patent proprietor (appellant 1) requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, alternatively, that the patent be maintained in amended form on the basis of auxiliary request 1 (dismissal of the opponent's appeal), or on the basis of one of auxiliary requests 2 to 24 or 1A to 24A as first submitted on 11 March 2022, or auxiliary requests 3' to

14' and 3A' to 14A' as first submitted on 5 April 2024. The order of these requests is such that each request number is followed by its A variant and - where available - its prime variant and then its A prime variant.

VIII. The opponent (appellant 2) requested that the decision under appeal be set aside and that the patent be revoked.

Reasons for the Decision

Auxiliary request 1

1. Consideration of the objection based on D11
 - 1.1 According to the patent proprietor, the objection starting from D11 should not be taken into consideration. They took the view that the opponent had raised a large number of attacks and initially focused on other documents. It should not be permissible to shift starting points at will. The opposition division was correct to not hear the opponent's argument starting from D11 during the oral proceedings. Furthermore, D11 was not a relevant document because the presence of rare earth oxides and ZnO were not characteristic features of the glass compositions of D11, considering D11 as a whole.
 - 1.2 However, the opponent never withdrew their objection of lack of an inventive step starting from D11 (see the impugned decision, point II.7.3). This objection had been raised in the notice of opposition (point III.4.5). D11 was one of several documents cited against

the patent as granted, which were all described to have the same single distinguishing feature. This might be seen as repetitive and thus unnecessary in so far as only the patent as granted is concerned. However, it has to be taken into account that the patent in suit may be - and in this case was - amended during the proceedings. It is clear that different documents are of different relevance to different possible amendments.

Moreover, the opponent had initially relied on D4 and D8 published within the priority period. They had contested the validity of the priority claim of the patent in suit and more specifically the applicant's entitlement to the priority right. It was a normal procedural development that the focus shifted away from this approach when G 1/22 and G 2/22 were issued, in light of which the opponent's objection was eventually dismissed (point II.3.1 of the impugned decision).

- 1.3 Furthermore, one of the reasons given by the opposition division for not hearing the opponent's argument starting from D11 was that *"given the same distinguishing features and very similar disclosures of D11 and D12, and that claim 1 of the main request has already been found inventive over D12, a different outcome concerning the inventive step of claim 1 of auxiliary request 1 over D11 cannot be expected"* (point II.7.3 of the impugned decision).

However, the Board, in its communication pursuant to Article 15(1) RPBA, came to the preliminary opinion that the subject-matter of claim 1 of the main request appeared to lack an inventive step over D12. The Board thus took a different preliminary view on the issue which had formed the basis for the opposition

division's assessment that D11 would not have rendered obvious the subject-matter of auxiliary request 1.

The circumstances are therefore no longer the same.

- 1.4 The patent proprietor also took the view that D11 was not a relevant document because the presence of rare earth oxides and ZnO was not a characteristic feature of the glass compositions of D11, considered as a whole.

However, the patent in suit relates to glass compositions for forming fibres (paragraph [0001]). D11 also relates to glass fibre compositions (paragraph [0009] of D11a) and thus a similar purpose. The disclosed compositions are also similar. Examples 8 and 9 of D11 in fact contain a rare earth oxide. D11 is therefore a suitable starting point for assessing inventive step, as had also been the opposition division's view.

- 1.5 In light of the above, the circumstances of the appeal case justify the admittance of the objection starting from D11, and it is therefore taken into account (Article 12(6) RPBA).

2. Inventive step in view of D11

- 2.1 As indicated above (point 1.4), D11 relates to a similar purpose as the patent in suit and is a suitable starting point for assessing inventive step, Examples 8 and 9 being particularly relevant.

- 2.2 The patent in suit addresses the technical problem of providing a composition for making glass fibres having

improved mechanical properties, such as improved modulus and improved tensile strength (paragraphs [0021] and [0055]). The patent proprietor submitted that the thermal resistance was also improved.

- 2.3 The proposed solution is the glass composition according to claim 1 of the patent in suit, in which *"ZnO is present in an amount up to 4 weight percent"*.

Both parties construed this feature as requiring the presence of ZnO. The present considerations are therefore based on this understanding. However, this feature does not imply any specific minimum amount of ZnO.

The patent proprietor saw an additional difference in the claimed range of *"between 10 and 16 weight percent"* MgO, which in their view did not include the limit value of 10 wt%. This view cannot be followed and in fact even contradicts the description (paragraph [0019] of the patent in suit).

- 2.4 It was debated whether the problem posed (see point 2.2) was successfully solved and whether there was any evidence for the alleged effect of ZnO to improve (increase) modulus and tensile strength. It was also debated whether any increase in liquidus temperature constituted a desirable effect in the context of the teaching of the patent in suit and reflected improved thermal resistance.

- 2.4.1 It is generally described in paragraph [0055] of the patent in suit that ZnO can be used to replace or reduce the amount of CaO in some embodiments and that this is believed to improve the sonic modulus and tensile strength of the glass fibres and to lower the

risk of crystallisation of wollastonite ($\text{CaO} \cdot \text{SiO}_2$) and/or anorthite ($\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$) in the melt.

The patent in suit does not explicitly address the effect of ZnO in the examples. Examples 114 and 116 are the only examples according to the claim (see paragraph [0138]). However, the properties of these two compositions (such as liquidus temperature and fibre modulus) are not described in the patent in suit (see the table on page 46). These data were only provided by the patent proprietor with the reply to the notice of opposition (and again on page 7 of the patent proprietor's statement of grounds of appeal, see the table). On the basis of said data in conjunction with the indications in Table 1 of the patent in suit, the opponent provided a comparison of Examples 114 and 116 with reference Examples 36 and 37 (see the table provided by the opponent on page 7 of their statement of grounds of appeal). It shows that the ZnO-containing compositions according to the claim result in a *lower* fibre modulus, contrary to what would have been desired, and a *higher* liquidus temperature T_L than reference Examples 36 and 37.

- 2.4.2 The patent proprietor contested the validity of this comparison because the compositions also differed in other respects. The patent proprietor took the view that the comparison of Examples 114 and 116 (according to the invention) with Examples 36 and 37 was not meaningful in particular because the respective amounts of rare earth oxide were different (4.22% in Examples 114 and 116 according to the invention versus 4.44% in Examples 36 and 37), and this higher amount of rare earth oxide in the reference examples was the reason for their higher fibre moduli. Examples 114 and 116 should instead be compared with reference Examples 34

and 35, respectively, which had a rare earth oxide content of 4.21%. Such a comparison was more significant and demonstrated that the presence of ZnO *improved* the fibre modulus. At the same time, the liquidus temperature was higher, which normally went along with, for example, a higher glass softening temperature. This reflected high thermal resistance and was desirable for the high-temperature applications mentioned in the patent in suit (paragraphs [0066] and [0121]). The patent in suit aimed for a good balance between low production costs, i.e. a relatively low fibre-forming temperature, and sufficient thermal resistance for high-temperature applications.

2.4.3 However, irrespective of whether this comparison with Examples 34 and 35, which was put forward for the first time during the oral proceedings before the Board, should be disregarded, it does not establish the alleged beneficial effect of ZnO. Examples 34 and 35 relate to a relatively higher amount of SiO₂ and a relatively lower amount of Al₂O₃ than Examples 36, 37, 114 and 116. The contents of other components, for instance, CaO and MgO, also differ. At the same time, the difference in rare earth oxide content between Examples 36/37 and 114/116, which according to the patent proprietor was crucial, is small (0.22 percentage points). It is consequently not justified to disregard Examples 36 and 37 and to consider the comparison of the inventive examples with Examples 34 and 35 alone.

2.4.4 There is no proof that the *lower* modulus in Examples 116 and 117 over reference Examples 36 and 37 was to be attributed to the rather small difference in rare earth oxide content, there also being other differences, as indicated. By the same token, it can also not be

concluded that the slightly higher fibre modulus in Examples 116 and 117 compared with reference Examples 34 and 35 was due to the presence of ZnO.

Considering the indicated examples as a whole and grouping them according to the rare earth oxide present (La_2O_3 or Y_2O_3), the fibre modulus in reference Example 34 (92.2 GPa) is slightly lower, and that in reference Example 36 (94.1 GPa) is slightly higher than that in the ZnO-containing Example 114 (92.8 GPa). The relationship is the same in the La_2O_3 -containing examples, the fibre modulus in reference Example 35 (90.9 GPa) being slightly lower, and that in reference Example 37 (92.8 GPa) being slightly higher than that in the ZnO-containing Example 116 (91.7 GPa). The differences in specific fibre modulus (i.e. relative to fibre density) are even smaller. These examples as a whole thus do not demonstrate any consistent improvement of the ZnO-containing examples according to the invention over the indicated reference examples without ZnO, even though the ZnO content in Examples 116 and 117 is relatively high (3.22 wt% ZnO) and lies in the upper part of the claimed range of up to 4 wt%. The indicated examples as a whole therefore do not demonstrate that the presence of ZnO was associated with an improved fibre modulus.

2.4.5 Moreover, it can be derived from the indicated examples as a whole that the ZnO-containing examples have a *higher* liquidus temperature. However, as convincingly argued by the opponent, the skilled person would normally regard it as desirable that the liquidus temperature be relatively *low* because that was associated with a low risk of undesirable crystallisation during fibre forming. Indeed, the liquidus temperature characterises the melt and is thus

relevant to the fibre-forming process. Accordingly, the patent in suit itself teaches that the *difference* between the forming temperature (i.e. the temperature linked to a melt viscosity of 1000 poise, [0062]) and the liquidus temperature is desirable for fibre forming (paragraph [0064]). A rather low temperature range of in particular 1190°C to 1260°C is indicated for the liquidus temperature (paragraph [0063]). In so far as the patent in suit mentions ZnO in relation to melt properties, it is likewise stated that ZnO is believed to *lower* the risk of crystallisation of certain phases (i.e. by lowering the CaO activity, the risk of crystallisation of wollastonite and/or anorthite is lowered), see paragraph [0055]. In contrast, there is no teaching in the patent in suit that the liquidus temperature should be *high*. There is no indication either that the liquidus temperature is directly correlated with characteristics of the finished fibres, such as the glass softening temperature. The fact that a high glass softening temperature is desirable for thermal insulation applications (paragraphs [0080] and [0121]) therefore does not imply that a high liquidus temperature would likewise be desirable, in contrast to the patent proprietor's view.

Consequently, it cannot be assumed that the skilled person would generally strive for a high liquidus temperature of glass compositions for fibre forming. Nor is there any teaching in the patent in suit that an increase in the liquidus temperature was the aim in the current case. This also cannot be derived from the examples in the patent in suit because, as outlined above, the corresponding data are not contained in the patent in suit but were only provided during the proceedings.

- 2.4.6 In light of the above, an effect of ZnO on fibre modulus would have been desirable but has not been proven. An effect of ZnO to increase liquidus temperature is supported by the available data but may not be relied upon because it would not have been derived by the skilled person as being encompassed by the technical teaching and embodied by the same originally disclosed invention within the meaning of G 2/21 (headnote II) - if it is not, in fact, a disadvantageous effect.
- 2.5 Consequently, the objective technical problem is to be reformulated in a less ambitious manner and is merely providing an alternative glass composition for fibre forming.
- 2.6 The skilled person would be aware that ZnO is a possible component of glass compositions for fibre forming (see D5, which represents common general knowledge). D5 teaches that the addition of ZnO and TiO₂ to the boron-free quaternary E-glass (electrical glass) system enhances the corrosion resistance of the resulting ECR glass (E-glass corrosion resistant) fibres while at the same time reducing the forming temperature (page 29, right-hand column, first full paragraph). It is correct that the glass system of D5 (see Table 1) contains different proportions of Al₂O₃, CaO and MgO from those in Examples 8 and 9 of D11. However, the disclosure in D5, which represents common general knowledge, nevertheless shows that ZnO is a known component of glass compositions for fibre forming. The glass compositions of D5 and D11 are similar enough for the skilled person to not expect any incompatibility, in particular if ZnO is added in a very small amount.

The skilled person faced with the problem of merely providing an alternative would thus readily contemplate the presence of a minor amount of ZnO, e.g. 0.01 wt%, in the compositions known from D11 and thereby arrive at a composition within the scope of claim 1 of auxiliary request 1, any detectable amount of ZnO being encompassed by the claim. This is one of many possible modifications available to the skilled person merely striving to provide an alternative, i.e. to obtain a different composition. It is a merely arbitrary choice from a host of possible solutions which cannot be considered inventive (Case Law of the Boards of Appeal of the EPO, 11th edn., 2025, I.D.9.21.9a)). In such a case, the prior art does not need to contain any incentive for the skilled person (ibid.).

- 2.7 The skilled person starting from Example 8 or 9 of D11 would thus arrive in an obvious manner at the subject-matter of claim 1.
- 2.8 The subject-matter of claim 1 of auxiliary request 1 consequently lacks an inventive step in view of D11.

Main request

- 3. Claim 1 of the main request is less specific than claim 1 of auxiliary request 1, i.e. it encompasses the subject-matter of claim 1 of auxiliary request 1. This has not been disputed. To the contrary, the patent proprietor acknowledged that the same arguments apply for the subject-matter of claim 1 of the main request as for auxiliary request 1. Claim 1 of the main request consequently lacks an inventive step for the same reasons outlined for auxiliary request 1.

Auxiliary request 24

4. Inventive step

4.1 Reference is made to the considerations regarding claim 1 of auxiliary request 1 (see point 2. above).

4.2 According to the patent proprietor, the technical problem was providing a glass composition with favourable fiberisation properties which could be formed into fibres at low costs and which had good heat resistance and a very good fibre modulus, superior to that of known S-glass.

The patent proprietor identified the following distinguishing features of the subject-matter of claim 1 over the disclosure of Examples 8 and 9 of D11.

- (a) ZnO is present in an amount of up to 4 weight percent
- (b) The at least one rare earth oxide comprises La_2O_3 .
- (c) The at least one rare earth oxide is present in an amount between 3 and 8 weight percent
- (d) The $\text{Na}_2\text{O} + \text{K}_2\text{O}$ content is less than 0.5 weight percent.

The patent proprietor took the view that all components in the glass composition interacted to solve the problem posed. Regarding the contribution of ZnO, they referred to the comments made referring to auxiliary request 1 (see point 2. above). With regard to the selection of La_2O_3 , they submitted that this rare earth oxide had a desirable impact on glass softening and glass transition temperatures, as could be seen in Figure 3 of the patent in suit. The amount of between 3 and 8 weight percent was associated with an improved

fibre modulus and improved strength, as was depicted in Figures 1 and 2 and taught in paragraph [0032]. The $\text{Na}_2\text{O} + \text{K}_2\text{O}$ content clearly implied a further restriction of the broader ranges indicated for each of Na_2O and K_2O individually. Na_2O and K_2O acted as fluxing agents that lowered the liquidus temperature and the modulus. Limiting the possible amount of Na_2O and K_2O allowed obtaining a high fibre modulus and good thermal resistance. This could be derived from a comparison of Example 26 with Example 116.

According to the patent proprietor, a glass composition was a complex system, the properties of which were the result of the interaction of all components present. The skilled person would not have been prompted by the prior art to effect the numerous modifications needed to arrive at the claimed glass compositions to solve the technical problem posed. This was even more so as each modification entailed a counterbalancing of the other components. This would have the consequence that their amounts, for instance, of MgO , could fall outside the scope of the claim. This also applied even if the technical problem was merely providing an alternative. The skilled person would have been unable to predict the resulting properties of the glass composition when making all these modifications.

- 4.3 These arguments are not convincing. No experimental data are available to compare the compositions known from Examples 8 and 9 of D11 directly with a composition according to the claim. There is no evidence of any combined effect of the distinguishing features. Nor has it been shown that any of the distinguishing features identified by the patent proprietor contributes to the effects sought.

- 4.3.1 There is no reason to assess the contribution of the presence of ZnO differently to auxiliary request 1 (see point 2. above). It thus merely constitutes an arbitrary modification.
- 4.3.2 The claimed range for the amount of rare earth oxide and the choice of the presence of La_2O_3 cannot be associated with any improvement either.

Irrespective of whether Figures 1 and 2 of the patent should be disregarded because they were cited for the first time during the oral proceedings before the Board, these figures merely show that at least for the presence of 3 wt% La_2O_3 , i.e. a rare oxide type and content within the claimed range, the modulus and strength are similar to S-glass, meaning that no improvement is obtained. Furthermore, these figures do not depict examples according to the invention. Example 116, which is the only example within the scope of the claim, has a fibre modulus of 91.7 GPa (see page 7 of the patent proprietor's grounds of appeal) and thus does *not* show the desired improvement over that of S-glass (92 GPa; see Figure 1 of the patent in suit) either.

The other teachings in the patent in suit do not lead to any different conclusion. Paragraph [0032] is very general and states that the selection of a particular rare earth oxide and its relative amount can impact the fibre density and in turn the specific strength and specific modulus but does not establish a concrete technical effect of the claimed rare earth oxide content and type. The general disclosure regarding La_2O_3 is similar to that regarding other rare earth oxides (see paragraphs [0025] to [0031]), supporting the view that these rare earth oxides can be used

interchangeably. Figure 3 relates to the softening point and the transition temperature as a function of the rare earth oxide and content. Again, the compositions shown are not within the scope of the claim. Moreover, according to this figure, the effect of La_2O_3 is the *least* pronounced of the rare earth oxides shown. There is no increase in these parameters, i.e. no improvement in thermal resistance, over the corresponding Y_2O_3 -containing compositions.

There is consequently no evidence that the claimed range for the amount of rare earth oxide and the choice of the presence of La_2O_3 led to any improvement compared with the presence of 1 wt% Y_2O_3 or CeO_2 in Examples 8 and 9 of D11. This is all the more so as the wording of the claim at issue is that the rare earth oxide "*comprises*" La_2O_3 . Other rare earth oxides may thus additionally be included, meaning that the effect of the rare earth oxide is not that of La_2O_3 alone.

- 4.3.3 The claim is inconsistent as to the amounts of Na_2O and/or K_2O present, considering that the upper limit of each of Na_2O and K_2O is 1 wt% while the content of $\text{Na}_2\text{O} + \text{K}_2\text{O}$ is less than 0.5 wt%. This notwithstanding, there is no evidence of any technical effect of an upper limit of 0.5 wt% compared with the content of $\leq 0.8\%$ in Examples 8 and 9 of D11. The patent in suit describes suitable ranges for the Na_2O and K_2O contents but does not specify the associated effects (paragraphs [0046] to [0049]). Example 26 relates to a composition with a Na_2O content of 1.12 wt% and a K_2O content of 0.09 wt%, above the claimed range for $\text{Na}_2\text{O} + \text{K}_2\text{O}$. Irrespective of whether this example should be disregarded because it was cited for the first time during the oral proceedings before the Board, it cannot be directly compared with Example 116 because it

differs from Example 116 at least in that no ZnO (which may affect the liquidus temperature, i.e. affect the melt properties, see above) and no Li₂O are present.

- 4.4 Moreover, no improvement over Examples 8 and 9 of D11 has been demonstrated. The patent proprietor submitted that the claimed composition could be fiberised at a lower temperature and thus at a lower cost than S-glass and exhibited a good fibre modulus, superior to that of S-glass (S-glass having a liquidus temperature of about 1500°C and a modulus of 88 to 91 GPa, according to Table 2 of D5, cited by the patent proprietor during the oral proceedings before the Board). This, however, is irrelevant to whether an improvement over D11 is obtained. The temperatures relevant to the fiberisation process are the forming temperature, the liquidus temperature and the difference between them. The forming temperature of the example according to the invention is, however, unknown. The liquidus temperature of Examples 8 and 9 of D11 is even lower than that of the example according to the invention. Furthermore, it is unknown whether the claimed compositions are particularly suitable for high-temperature applications because - as outlined with regard to auxiliary request 1 - there is no indication that the liquidus temperature would be relevant in this respect, and other parameters are unknown. Moreover, the fibre moduli of Examples 8 and 9 as reported in D11 (96.8 GPa and 96.1 GPa, respectively, see the table on page 7) are also higher than that of S-glass. While the compositions according to the claim have better properties than S-glass, this does not reflect any improvement compared with D11.

4.5 In summary, the technical problem needs to be reformulated in a less ambitious manner and is again that of providing an alternative.

4.6 The skilled person would be aware that ZnO is a known component of glass compositions for making glass fibres, as outlined with regard to auxiliary request 1.

The other necessary modifications to arrive at the subject-matter of claim 1 constitute selections within the disclosure of D11. Specifically, D11 lists La_2O_3 as a possible alternative to Y_2O_3 and CeO_2 and discloses a total amount of these of not more than 3 wt% (D11a, paragraphs [0020] and [0049]), thus including the value of 3 wt%. The total amount of $\text{Na}_2\text{O} + \text{K}_2\text{O}$ is specified to be not more than 0.8 wt%, in line with the general disclosure that it is 0.1 to 0.8 wt% (D11a, paragraph [0018]). It may thus be less than 0.5 wt%. The skilled person faced with the technical problem of merely providing an alternative would readily make these modifications within the general disclosure of D11.

It is not convincing either that this would entail an adaptation of the contents of the other components to such an extent that the composition as a whole would fall outside the scope of the claim.

Indeed, only a minor amount of ZnO would need to be added (e.g. 0.01 wt% or even less), there being no lower limit in the claim. Such a low amount does not entail any relevant adjustment of the contents of the other components, having regard to the precision used in D11 and the claim at issue.

The other adjustments are addressed in the following. Starting from any one of Examples 8 and 9 of D11, the

Na₂O + K₂O content is to be reduced by at most 0.3 percentage points while the rare earth oxide content (comprising La₂O₃) is to be increased by 2 percentage points. Overall, this results in an addition of material to the known composition. This addition needs to be compensated for by the reduction of some other amount in the composition. As convincingly argued by the opponent during the oral proceedings, a reasonable approach for the skilled person would be to reduce the content of SiO₂ and Al₂O₃ because these are the constituents of the glass network and the main components of the composition. This approach would leave the content of 10 wt% MgO unaffected and would lead to a composition within the scope of the claim. The MgO content is the only one at the lower end of the respective claimed range and thus the only value which could fall out of the claimed range if material is added. The skilled person may alternatively add 2 parts by weight of rare earth oxide to 98 parts by weight of the composition as a whole, meaning that the contents of the other components would be reduced proportionally to 98% of their initial values. The MgO content would accordingly be reduced to 9.8 wt%. Irrespective of whether this can be distinguished from the claimed limit of 10 wt% (i.e. expressed without a decimal place), it would at most be another minor arbitrary modification to bring that value back to 10 wt%.

As indicated, all the ranges of claim 1 at issue - with the exception of the presence of ZnO, the amount of which may be so low that it does not affect the content of the other components - constitute selections within the disclosure of D11. In the absence of any technical effect, these selections are arbitrary. They again represent arbitrary choices from a host of possible solutions and thus do not support an inventive step

(Case Law of the Boards of Appeal of the EPO, 11th edn., 2025, I.D.9.21.9a)). An inventive step cannot be acknowledged merely because there are *several* arbitrary choices (see also T 1984/15, Reasons 4.5).

- 4.7 The subject-matter of claim 1 of auxiliary request 24 consequently lacks an inventive step in view of D11.

Auxiliary requests 2 to 23

5. Claim 1 of each of auxiliary requests 2 to 23 is less specific than claim 1 of auxiliary request 24, i.e. it encompasses the subject-matter of claim 1 of auxiliary request 24. This has been acknowledged by the patent proprietor. Claim 1 of each of these auxiliary requests consequently lacks an inventive step for the same reasons outlined with regard to auxiliary request 24. Auxiliary requests 2 to 23 are therefore not allowable.

Auxiliary request 1A

6. Article 123(2) EPC
- 6.1 Compared with auxiliary request 1, it is additionally specified in claim 1 that SnO₂ "*is present in an amount up to 4 weight percent*". According to the patent proprietor, the claim now requires the presence of SnO₂ in the glass composition (patent proprietor's statement of grounds of appeal, point 19 on page 29), i.e. both ZnO and SnO₂ are *essential* components (see also point 2.3 above).
- 6.2 According to the opponent, there was no direct and unambiguous disclosure in the application as filed of

compositions in which both ZnO and SnO₂ were present in combination, as now specified in claim 1.

This objection was first raised during opposition proceedings (9 February 2024) against the combination of features in claim 1 of the A variant of the auxiliary requests. It was not dealt with by the opposition division because a higher ranking request was allowed. The same combination of features was not present in the claims as granted, considering that claim 14 (presence of SnO₂) did not refer back to claim 3 (CaO content of *less than* about 5 weight percent). The patent proprietor's argument that this objection should have been raised against the patent as granted, along with the opponent's other objections under Article 100(c) EPC, is therefore not convincing.

This objection is taken into consideration (Article 12(4) RPBA).

- 6.3 It was under debate whether it could be derived directly and unambiguously from the application as filed that ZnO and SnO₂ were present in combination as essential components of the claimed glass composition.
- 6.4 The application as filed discloses a glass composition corresponding to claim 1 as filed as "one embodiment" (page 2, lines 6 to 11). It is stated that "in some embodiments", the CaO content is less than about 5 wt% (page 2, lines 19 to 20). It is furthermore stated that SnO₂ is present "in some embodiments", and likewise that ZnO is present "in some embodiments" (page 2, lines 26 to 28), but there is no disclosure that the same embodiment is meant in all these cases. The presence of ZnO and SnO₂, respectively, is discussed in separate paragraphs on

page 16, line 28 to page 17, line 20, without any pointer that they were to be present in combination. In fact, none of the many (124) examples contains ZnO and SnO₂ at the same time. Rather, Examples 114 and 115, among others, show that ZnO and SnO₂ are used as alternatives. Similarly, original claims 15 and 16 (specifying the presence of ZnO and, respectively, SnO₂) independently refer back to claim 1 only. In this case, the disclosure of SnO₂ and ZnO as optional components in claim 1 as filed does not amount to direct and unambiguous disclosure of the presence of both SnO₂ and ZnO as essential components, let alone in conjunction with the selected range of the CaO content.

- 6.5 The requirements of Article 123(2) EPC are therefore not met.

Auxiliary requests 2A to 24A

7. Article 123(2) EPC
- 7.1 Claim 1 of each of auxiliary requests 2A to 24A contains the same amendment as auxiliary request 1A, according to which both ZnO and SnO₂ are essential components. There were no arguments specific to these auxiliary requests. No reason is seen why this amendment should be assessed differently than for auxiliary request 1A. Thus, the same conclusion applies as outlined for auxiliary request 1A (see point 6.), i.e. the requirements of Article 123(2) EPC are not met.
- 7.2 Auxiliary requests 2A to 24A are therefore not allowable either.

Auxiliary requests 3' to 14' and 3A' to 14A'

8. Article 12(4) RPBA

8.1 Auxiliary requests 3' to 14' and 3A' to 14A' (the prime versions of the auxiliary requests) were filed during opposition proceedings, only four days before the oral proceedings and after the final date set according to Rule 116 EPC. The admittance of these requests, which was contested by the opponent, was not dealt with by the opposition division because a higher-ranking request was allowed, but it would have been within the discretion of the opposition division to do so.

8.2 When re-submitting these requests with their statement of grounds of appeal, the patent proprietor did not demonstrate that they had been admissibly raised and maintained during the opposition phase (Article 12(4) RPBA). During the oral proceedings before the Board, the patent proprietor argued that these requests should be taken into account as a reaction to the opponent's letter of 9 February 2024, in which new documents were cited and in which D11 was used as the closest prior art. The requests provided a further distinction from D11 without bringing new aspects into the discussion.

8.3 However, the filing of the prime versions of the auxiliary requests cannot be seen as a timely response to the opponent's objection based on D11, which had been raised in the notice of opposition. The filing of these requests cannot be justified by the opponent's late filing of further documents on 9 February 2024 either because, on substance, they do not constitute a response to these documents, which are irrelevant to the current decision.

These requests consequently constitute an amendment of the patent proprietor's appeal case, and their consideration is at the discretion of the Board (Article 12(4) RPBA).

- 8.4 If admitted, these requests appear to constitute another non-converging attempt to address the opponent's objection of lack of an inventive step. Moreover, while the newly inserted feature as such may have an express basis on page 7, lines 25 to 26 of the application as filed, it has not been shown that this disclosure relates to the embodiments now claimed, comprising CaO in an amount of less than 5 wt%. This applies all the more to the embodiments in the lower-ranking requests involving additional limitations in claim 1. Finally, it is doubtful whether a range of "*greater than 3 wt%*" in this case can be clearly delimited from an amount of "*not more than 3 wt%*" as taught in D11. The patent proprietor's argument that these requests provided a further distinction from D11 without bringing new aspects into the discussion is therefore not convincing.
- Therefore, the Board cannot exercise its discretion to admit these requests into the appeal proceedings because of their complexity and their unsuitability for addressing the issues which led to the decision under appeal. Furthermore, admitting these requests would be contrary to the need for procedural economy.
- 8.5 In light of the above, these requests cannot be taken into consideration.

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:



L. Gabor

T. Burkhardt

Decision electronically authenticated