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**Datasheet for the decision
of 18 April 2013**

Case Number: T 0463/10 - 3.3.05

Application Number: 97305455.4

Publication Number: 820964

IPC: C03C 3/087, C03C 4/02,
C03C 1/10

Language of the proceedings: EN

Title of invention:
Blue coloured glasses

Patent Proprietor:
Pilkington Group Limited

Opponent:
PPG Industries, Inc.

Headword:
Coloured Glasses/PILKINGTON GROUP LTD.

Relevant legal provisions:
EPC Art. 54, 114(2)

Keyword:
"Novelty (main request): no"
"Admissibility of the auxiliary request (no) - late filed -
admission would raise new technical issues"

Decisions cited:
-

Catchword:
-



Case Number: T 0463/10 - 3.3.05

DECISION
of the Technical Board of Appeal 3.3.05
of 18 April 2013

Appellant: PPG Industries, Inc.
(Opponent) One PPG Place
Pittsburgh, Pa.15272 (US)

Representative: Fleischer, Holm Herbert
polypatent
Postfach 40 02 43
D-51410 Bergisch Gladbach (DE)

Respondent: Pilkington Group Limited
(Patent Proprietor) Prescott Road
St. Helens
Merseyside WA10 3TT (GB)

Representative: Pettet, Nicholas Edward
Pilkington Group Limited
Intellectual Property
Pilkington European Technical Centre
Hall Lane
Lathom
Ormskirk, Lancashire L40 5UF (GB)

Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
22 December 2009 concerning maintenance of
European patent No. 820964 in amended form.

Composition of the Board:

Chairman: G. Rath
Members: H. Engl
D. Prietzel-Funk

Summary of Facts and Submissions

I. European patent No. 0 820 964 was granted with 13 claims.

The independent claims 1 and 12 read as follows:

"1. A heat-absorbing blue glass composition comprising a base glass composition comprising:

SiO ₂	65% to 75% (by weight)
Na ₂ O	10% to 18%
K ₂ O	0% to 5%
MgO	0% to 5%
CaO	4% to 14%
Al ₂ O ₃	0% to 5%
B ₂ O ₃	0% to 5%
BaO	0% to 5%

and a colorant portion containing iron and cobalt characterised in that the colorant portion consists essentially of

Total Iron (expressed as Fe ₂ O ₃)	0.4% to 1.1% (by weight)
Co ₃ O ₄	10ppm to 75ppm

the proportion of iron in the ferrous state lying within the range of 20% to 40%, optionally 26% to 35%, the glass having, in a thickness of 1 to 6 millimetres, a direct solar heat transmission at least 16, optionally 20, percentage points less than the visible light transmission, a dominant wavelength lying in the range of 480nm, optionally 484, to 490nm and a colour purity of at least 6%."

- "12. A laminated glass comprising a glass product produced from a composition as claimed in claim 11 laminated to any other suitable material."
- II. The patent was opposed under the grounds of opposition according to Article 100(a) EPC (lack of novelty and lack of inventive step). The opponent requested revocation of the patent in its entirety.
- III. In its decision, the opposition division maintained the European patent in amended form, based on claims 1 to 14 filed during oral proceedings.
- IV. The following documents were among those cited in the opposition proceedings:
- D1: EP-A-0 814 064
D2: EP-A-0 527 487.
- V. The opposition division decided that, in view of the introduction of allowable disclaimers into claims 1 and 2, document D1 (which constituted prior art under Article 54(3) EPC) no longer anticipated the claimed subject-matter. Nor did document D2, as was acknowledged by the opponent.

Starting from D2 as the closest prior art, the opposition division saw the problem to be solved by the opposed patent as providing less highly reduced, blue, heat-absorbing glass without the use of other colorants.

The solution to this problem consisted in lowering Fe^{2+} , omitting S^{2-} and keeping the ferrous iron content lower than in D2, while adding cobalt oxide in compensation. D2 did not give a hint as to which compound should be modified or omitted altogether in order to produce a blue glass with the desired solar heat transmission without the need for expensive additives such as CeO_2 .

Consequently, the subject-matter of the main request was considered to meet the requirements of Articles 54 and 56 EPC.

VI. The present appeal is from the above mentioned decision of the opposition division to maintain the European patent in amended form. The opponent's (appellant's) notice of appeal and the grounds for appeal were received by letters dated 24 February 2010 and 30 April 2010, respectively.

The following new documents were also filed:

D7: WO-A-96/00 194

D7': US-A-5 837 629 (based on D7)

VII. The respondent (patentee) filed its observations by letter dated 7 October 2010. It also submitted the new document

D8: Fay V. Tooley, *"The Handbook of Glass Manufacture"*, Vol. 1, pages 36 and 37.

VIII. In a further submission dated 30 December 2010 the appellant put forward reasons for the late filing of documents D7 and D7'.

IX. Under cover of a letter dated 18 March 2013 the respondent filed new sets of claims constituting first to fourth auxiliary requests.

X. Oral proceedings took place before the board of appeal on 18 April 2013. The respondent filed new sets of claims as a main request and an auxiliary request, which replaced all previous requests.

XI. Claim 1 of the main request is worded as follows:

"1. A heat-absorbing blue glass composition comprising a base glass composition comprising:

SiO ₂	65% to 75% (by weight)
Na ₂ O	10% to 18%
K ₂ O	0% to 5%
MgO	0% to 5%
CaO	4% to 14%
Al ₂ O ₃	0% to 5%
B ₂ O ₃	0% to 5%
BaO	0% to 5%

and a colorant portion containing iron and cobalt characterised in that the colorant portion consists essentially of

Total Iron (expressed as Fe₂O₃) 0.4% to **0.9%** (by weight)
Co₃O₄ **35 to 75 ppm, optionally 35 to 65 ppm**

the proportion of iron in the ferrous state lying within the range of 20% to 40%, optionally 26% to 35%, the glass having, in a thickness of 1 to 6 millimetres,

a direct solar heat transmission at least 16, optionally 20, percentage points less than the visible light transmission, a dominant wavelength lying in the range of 480nm, optionally 484, to 490nm and a colour purity of at least 6%, **the glass produced having an ultraviolet transmission (ISO) of less than 35%, optionally less than 32% and, in a 6 mm thickness, a visible light transmission in excess of 50%.**"

Claim 1 of the auxiliary request differs from claim 1 of the main request in that the value of the colour purity is amended to "10%".

XII. The appellant essentially argued as follows:

The appellant requested the board not to admit the patentee's auxiliary request. It was late-filed and raised technical questions which could not be properly addressed during the oral proceedings.

The subject-matter of claim 1 of the main request lacked novelty over D7, in particular example 3 thereof. Cerium oxide was not a colorant, but a fining agent and thus not excluded from the claimed glass compositions.

In any event, the claimed glass compositions provided no improvement over those known from the prior art (e.g. examples 3, 4 and 18 of D7) which showed essentially the same combination of spectral properties, in terms of dominant wavelength and colour purity, as well as UV, VIS and solar heat transmission values.

XIII. The respondent essentially argued as follows:

The respondent requested that D7 and D7' should not be admitted due to their being late filed and lacking relevance. In any case, D7 did not deprive the claims of novelty.

D7 disclosed glass compositions having a widely varying colouration, from neutral to blue or green, and intermediate nuances, as shown by the dominant wavelengths from 481 to 555 nm. The saturation also varied from almost colourless to intense.

The claimed glass compositions differed from D7 in that the colorant portion consisted only of Co and Fe, in the specified ranges. D7 proposed a range of colorants, including Se, Cr, Ni and Cu oxides.

The problem addressed by the present invention consisted in providing a blue coloured glass which could be made by the float glass process, which had excellent solar control properties while maintaining high light transmission, and yet used a colorant portion which avoided that were expensive or difficult to handle.

The claimed solution was based on the surprising realisation that a suitable glass could be formulated using a colorant portion consisting essentially of only two colorants, namely iron and cobalt.

D7 did not teach this realisation, but mentioned that other colorants may preferably be added, e.g. Ce, Se, Cr and Ni. D7 also suggested the use of refining agents

(Sb, As) which were incompatible with the float glass process.

XIV. Requests

The appellant requested that the contested decision be set aside and that the European patent be revoked.

The respondent requested that the appeal be dismissed and that the patent be maintained in amended form on the basis of the main request or the auxiliary request, both filed during oral proceedings.

Reasons for the Decision

1. Amendments

The board is satisfied that the amended claims comply with the requirements of Article 123(2) and (3) EPC.

Further comments in this respect are not necessary as the patent cannot be maintained for the reasons given below.

2. Admissibility of late-filed documents

Document D7 and its post-published family document D7' were filed after the expiry of the opposition period, with the opponent's (appellant's) appeal brief.

D7 is *prima facie* highly relevant for the assessment of novelty and inventive step, both for the granted claims

and for the claims now on file, as will become apparent from the discussion further below (point 4).

It was undisputed that D7 has been known to both parties for almost eight years from parallel opposition proceedings where the document was filed by the present respondent (see T 1647/09).

In view of these circumstances, the board exceptionally allows the introduction of D7 into the appeal proceedings.

3. Admissibility of the late-filed request

3.1 The admissibility of a request filed at a late stage in the appeal proceedings, for instance during oral proceedings, is governed by Article 13(1) RPBA. Said article provides that the admission of any amendment to a party's case after filing its grounds of appeal or reply thereto is at the board's discretion. Amendments to a party's case clearly include amendments to the claims.

In conformity with the case law, in the exercise of their discretion, the boards take into account criteria such as the complexity of the new subject-matter, the state of the proceedings, and procedural economy.

3.2 In the present case, the auxiliary request was filed by the respondent during oral proceedings, after substantive discussion of the claims of the main request, at a very late stage in the proceedings. The proposed amendment restricted claim 1 to glasses having a colour purity of at least 10% (a value taken from

granted claim 8), compared with at least 6% for the main request, in order to distinguish the claimed subject-matter over D7.

As pointed out by the appellant, due to the fact that the excitation purity (P_e in %) and TSUV of a glass depend on its thickness, a comparison between the subject-matter of claim 1 of the new auxiliary request and D1 would require a re-calculation of the excitation purity and TSUV values measured at 2.3 mm (TSUV 57.5%), at 3.9 mm (TSUV 46.4%) and at 5.5 mm thickness (TSUV 37.2%) (see D1, Tables 2, 3 and 4; TSUV standing for "total solar ultraviolet transmittance"; P_e standing for "excitation purity", corresponding to colour purity P_c). The corresponding values in the opposed patent were measured at 6 mm thickness (see claim 1 of the opposed patent). Similar issues would arise in connection with D7 (page 11, Table: examples 3 and 4), which recites colour purity (P_c) values of 6 and 6.8%, respectively, measured at 3.15 mm thickness (see page 9, lines 9 and 10), to be compared with values of the patent measured at 6 mm thickness. The extrapolation is not trivial, because colour purity and TSUV do not depend on sample thickness in a linear relationship. The question of novelty having regard to D1 and D7 thus could not be answered instantly with the required certainty.

The board concluded that the proposed amendment to the claims raised technical issues which could not be properly addressed without postponement of the oral proceedings. Consequently, the board exercised its discretion not to admit the late-filed request (Article 114(2) EPC; Article 13(1) and (3) RPBA).

4. Novelty (main request)

Claim 1 of the main request concerns a heat-absorbing blue glass composition comprising a silica-soda-lime base glass and a colorant portion. The colorant portion consists essentially of 0.4% to 0.9% of total Fe (expressed as Fe₂O₃) and 35 to 75 ppm of Co₃O₄. The claimed blue glasses exhibit, measured in a thickness of 1 to 6 millimetres, a direct solar heat transmission at least 16, optionally 20, percentage points less than the visible light transmission, a dominant wavelength in the range of 480nm to 490nm and a colour purity of at least 6%.

Such a glass is already known from D7. Example 3 of D7 (see page 11, Table) discloses a blue glass composition comprising:

Fe ₂ O ₃	0.68 %
FeO	0.183 %
CoO	0.038 % (approx. 41 ppm, expressed as Co ₃ O ₄)
Ce ₂ O ₃	0.55 %

and having the following spectral properties (measured at a thickness of 3.15 mm; see page 9, lines 3 to 10):

TL _A	71 %
T _E	52.3 %
T _{IR}	34.4 %
T _{UV}	20.7 %
λ _D	(dominant wavelength) 487.5 nm
P _C	(colour purity) 6 %.

The prior art glass thus falls within the compositional ranges and meets the spectral properties of the glasses claimed in claim 1 in accordance with the current main request.

The only glass constituent not mentioned in claim 1 of the opposed patent, but present in example 3 of D7, is 0.55% of cerium oxide. However, claim 1 of the main request does not exclude the presence of such an additional constituent in the base glass portion of the glass composition (*cf.* claim 1: "a base glass composition comprising:..."). The board cannot accept the argument of the respondent that Ce_2O_3 should be regarded as a colorant and consequently as excluded by the claims in view of the exhaustive definition of the colorant portion. It is true that D8 (page 36) mentions cerium oxide, together with titanium oxide, in a list of glass colorants imparting a yellow colour. However, at the same time, D8 (page 36, left hand column, last paragraph) states that CeO_2 is, in the absence of As, an economical decolorizing agent for glass. In any event, cerium oxide does not, alone or in combination with iron and cobalt oxide, produce a blue tint.

Most importantly, cerium oxide does not appear among the colorants listed in D7 (see page 8, lines 17 to 21). According to page 7, lines 21 to 26, of D7, Ce_2O_3 may be added, like titanium oxide, to increase UV-absorption. The fact that titanium oxide, present as an impurity in the batch materials, improves UV radiation absorption, is also acknowledged in the patent in suit (see paragraph [0016]).

The board concludes that Ce_2O_3 is present in the glass composition of example 3 of D7 to enhance UV-absorption, but not as a part of the colorant glass portion for creating a blue colour.

4.1 Consequently, the subject-matter of claim 1 of the main request lacks novelty having regard to D7. The claim is not allowable (Article 54 EPC).

5. As no allowable request is on file, the patent must be revoked.

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

C. Vodz

G. Rath