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Datasheet for the decision of 18 July 2008

Case Number: T 0593/06 - 3.3.05

Application Number: 02734756.6

Publication Number: 1397316

IPC: C03C 6/02

Language of the proceedings: EN

Title of invention:
Method of reducing volatilization from and increasing homogeneity in glass

Applicant:
Specialty Minerals (Michigan) Inc.

Opponent:
-

Headword:
Reducing volatilization from and increasing homogeneity in glass/SPECIALTY MINERALS (MICHIGAN) INC.

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

Relevant legal provisions (EPC 1973):
-

Keyword:
"Main request: novelty (no)"
"Auxiliary request: inventive step (no) - identification of a collateral effect when using a known compound for a known purpose"

Decisions cited:
G 0002/88

Catchword:

-

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Case Number: T 0593/06 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 18 July 2008

Appellant: Specialty Minerals (Michigan) Inc.
30600 Telegraph Road
Bingham Farms
Michigan 48025 (US)

Representative: Bawden, Peter Charles
Bawden & Associates
4 The Gatehouse
2 High Street
Harpenden
Hertfordshire AL5 2TH (GB)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 14 October 2005 refusing European application No. 02734756.6 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: G. Raths
Members: H. Engl
S. Hoffmann

Summary of Facts and Submissions

I. This appeal lies from the decision of the examining division, posted on 14 October 2005, to refuse European application EP 02734756.6.

II. The examining division found that all claims lacked clarity, contrary to Article 84 EPC. Furthermore, those features of claims 1, 3 and 5 not lacking clarity were already known from documents

D1: Database WPI, Section Ch, week 199041, Class L01, Derwent Publications Ltd., London, GB, Accession Number 1990-311377; & SU-A-1 530 588; and

D2: US-A-3 274 006.

Consequently, said claims were rejected as not novel.

III. The notice of appeal was filed on 28 December 2005. The statement of grounds of appeal and amended claims as a main and an auxiliary request were received on 3 March 2006.

IV. The independent claims thereof are worded as follows:

Main request:

"1. A method for preparing a glass composition, said method comprising forming a batch of glass-forming components by admixing a volatile component source containing a volatile selected from the group consisting of boron and heavy metals; a silicate compound of the formula $K_uNa_vAl_wCa_xMg_ySiO_z$ wherein K is

potassium, Na is sodium, Al is aluminum, Ca is calcium, Mg is magnesium, Si is silica, and 0 is oxygen and u, v and w, independently range from about 0 to about 0.5; x and y independently range from about 0.1 to about 0.6; and z is a value which balances the formula; and other glass-forming components; melting and refining the batch of glass-forming components in a furnace the resultant melt to obtain a glass composition; wherein said glass composition has a reduced variability of oxides distribution measured at the feed end of said furnace or a reduced loss of said volatile component than a glass composition having an equivalent composition produced without using said silicate compound."

Auxiliary request:

"1. Use of a silicate compound of the formula $K_uNa_vAl_wCa_xMg_ySiO_z$ wherein K is potassium, Na is sodium, Al is aluminum, Ca is calcium, Mg is magnesium, Si is silica, and 0 is oxygen and u, v and w, independently range from about 0 to about 0.5; x and y independently range from about 0.1 to about 0.6; and z is a value which balances the formula; in a method for preparing a glass composition, said method comprising forming a batch of glass-forming components by admixing the said silicate; a volatile component source containing a volatile selected from the group consisting of boron and heavy metals; and other glass-forming components; melting and refining the batch of glass-forming components in a furnace to obtain a glass composition; wherein use of the said silicate provides a reduced loss of said volatile component from the said glass composition than from a glass composition having an

equivalent composition produced without using said silicate compound."

V. In its statement of grounds of appeal, the appellant essentially argued as follows:

The examining division erred in its assessment of the claim features *"equivalent composition"*, *"reduced loss of volatiles"* and *"a reduced variability of oxides"* by construing them in an overly abstract manner. It was clear from the description that the skilled person, by using a silicate as defined in the claims, instead of conventional materials, would arrive at the same given end composition, which was referred to as equivalent composition. The basis for assessing the improvements provided by the invention was thus clearly defined. The technical problems of improving glass batch homogeneity and purity and reducing volatiles loss were known to the skilled person and therefore the technical background and basis for these concepts were known, too.

In fact, the inventor had for the first time appreciated that the level of heating required in order to melt and refine the components of a particular glass formulation was lower than the level required to melt and heat the components for said formulation when provided in a conventional manner, that is when the oxide values to provide the given final glass batch formulation are fed to the process in a form other than by using the silicate set out in the claims. The invention thus provided both enhanced product quality and reduced volatility through use of a lower melt and refining temperature and accordingly additional improvement through the action of the refining aid.

Such an improvement was not disclosed in the cited prior art. D1 related to glass compositions for a variety of uses in the ornamental and decorative industry, the formulations comprising sand, alumina, boric acid and diopside which is used as a filler or colourant because of its colour and lustre. There is no reference to refining aids nor any reference or emphasis on the volatility of components in the melting process. Although D1 referred to diopside in the context of glass making, it failed to disclose the use of the material to achieve the technical effect set out in the invention. In short, D1 related to an entirely different technical problem.

For these reasons, the use claims in accordance with the auxiliary request were a new use in the sense of decision G 2/88.

Further detailed arguments of the appellant concerned novelty and inventive step having regard to document D2. These are not of relevance in the context of this decision which is not based on D2.

VI. In an Annex to the summons for oral proceedings pursuant to Article 15(1) RPBA the board raised - as a provisional and unbinding opinion - detailed objections under Article 84 EPC (lack of clarity and support of the claims) and Articles 54(1)(2) and 56 EPC. Claim 1 of the main request was considered to lack novelty having regard to D1. All claims were objected on the ground of lack of inventive step having regard to documents

D3: WO-A-99/33765 and

D4: US-A-3 941 574

(known from the European search report).

VII. By letter dated 1 July 2008, the appellant withdrew the request for oral proceedings. No further arguments were put forward.

VIII. The appellant requested that the decision under appeal be set aside and the application remitted to the examining division with an order to grant a patent on the basis of the claims in accordance with the main request or the auxiliary request, both filed by letter dated 23 February 2006.

Reasons for the Decision

1. *Novelty*

1.1 Main Request

Document D1 discloses a method of making a molten glass composition from soda, sand, alumina, boric acid and diopside rock ($CaMg(SiO_3)_2$). The glass composition was fused at 1460°C to 1470°C for 5 to 6 hours.

Diopside satisfies the formula for the silicate compound in claim 1 of the main request, whereas boric acid is a source of a volatile compound within the meaning of said claim 1. Therefore, D1 discloses in combination all the features of claims 1, 3 and 5 in accordance with the main request. It is true that

diopside is added as a colourant for producing a stained, emerald-green or bluish-green glass and that no reference to refining aids or the volatility of components in the melting process is made. However, on the principle that the same causes must give rise to the same effects, diopside will effectively act in the same way as claimed in the present application, *i.e.*, it reduces melt viscosity, loss of volatiles and variability of oxides distribution, irrespective of whether or not said effects are explicitly taught in D1.

The subject matter of current claims 1, 3 and 5 in accordance with the main request therefore lacks novelty (Article 54(1)(2) EPC). The main request is not allowable.

1.2 Auxiliary request

The subject matter of the claims in accordance with the auxiliary request relates to a second non-medical **use**. Since none of the available prior art documents discloses the effect of reducing the loss of volatile components from the glass composition, as stated in the claim, it may thus be considered a novelty-imparting technical feature within the meaning of decision G 2/88 (OJ EPO 1990, 93; see Reasons, point 10.3 and Order (iii)).

The subject matter of claim 1 of the auxiliary request meets the requirements of Article 54(1)(2) EPC.

2. *Inventive step (auxiliary request)*

2.1 Closest prior art

The board considers document D3 to represent the closest prior art because it is concerned with a similar objective as the present application, that is, improving batch uniformity, reducing fining time, shortening melting times, *etc*. (see page 4, lines 2 to 5; page 16, third full paragraph). According to D3, these and other advantages are achieved by adding to the glass composition a silicate material comprising one or more compounds selected from calcium silicates, magnesium silicates and calcium magnesium silicates (page 4, second paragraph). A preferred silicate material is diopside ($CaMg(SiO_3)_2$) (page 15, last paragraph to page 16, line 4).

As advantageous effects of adding the silicate material to a glass batch, D3 explicitly mentions a better heat transfer, a lower fining time due to 30% to 40% less gas, and shorter melting times (page 16, third full paragraph).

D3 does not, however, teach reduced loss of volatiles.

2.2 In the light of the teaching of document D3, the technical problem underlying the application in suit therefore consists in reducing the loss of volatile components, selected from boron and heavy metals, from a glass composition during the melting operation.

2.3 As a solution to this problem the application in suit proposes the use of a silicate additive according to

the formula of claim 1 in a method comprising forming a batch of glass-forming components and refining the batch characterized in that the use of said silicate provides a reduced loss of volatiles.

2.4 The claimed use encompasses the formation of molten glass batches of any kind and composition, using a broad class of volatile component sources (boron and heavy metals). The desired reduction in volatile loss has been made plausible only for one particular glass melt (Example I). Moreover, the desired better homogeneity and reduced variability of oxides has been asserted only in a qualitative and indirect manner. It appears implausible to the board that addition of a silicate compound as claimed may effectively reduce melt viscosity and melt temperature in essentially all conceivable glass melts, irrespective of their compositions.

Although it is thus questionable whether the above stated technical problem has indeed been solved over the whole ambit of the claim, the board will assume, in favour of the appellant, that this is the case.

2.5 It remains to be decided whether or not the claimed solution is obvious having regard to the prior art.

As mentioned above, D3 already teaches the use of additives (*e.g.* diopside) for better heat transfer, lower fining time and shorter melting times. Evidently, a lower fining time and a shorter melting time both tend to reduce the total loss of volatiles because said loss depends - apart from on the melt temperature - also on the total time required for melting the glass

components and fining the glass batch. The person skilled in the art of glass making, confronted with the above defined technical problem, would thus have recognised that the diopside additive proposed in D3 exhibits, as an additional advantage, the effect of reducing the loss of volatiles. Diopside according to document D3 satisfies the formula of the silicate compound in claim 1 of the auxiliary request. The reduction of total loss of volatiles is a collateral effect which has been identified by the applicant. The identification of this effect however does not require any ingenuity.

2.6 Therefore, the use as defined in claim 1 in accordance with the auxiliary request does not involve an inventive step as required by Article 56 EPC. The auxiliary request is therefore also not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar The Chairman

S. Fabiani G. Raths