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**Datasheet for the decision  
of 19 August 2011**

**Case Number:** T 0518/08 - 3.3.05

**Application Number:** 98913041.4

**Publication Number:** 0915812

**IPC:** C03C 13/00

**Language of the proceedings:** EN

**Title of invention:**

Biosoluble pot and marble (flame attenuated)-derived  
fiberglass

**Appellant I/Patentee:**

Johns Manville International, Inc.

**Appellant II/Opponent:**

SAINT-GOBAIN ISOVER

**Headword:**

Pot and marble/JOHNS MANVILLE

**Relevant legal provisions:**

EPC Art. 56  
RPBA Art. 13(1)(3)

**Keyword:**

"Inventive step (main request): no - strong incentive in state  
of the art to try another manufacturing method"

"Admissibility of auxiliary request: no - new issues raised by  
amendments filed during oral proceedings"

**Decisions cited:**

T 1126/97, T 0081/03

**Catchword:**

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Case Number: T 0518/08 - 3.3.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.05  
of 19 August 2011

**Appellant II:**  
(Opponent)

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**Decision under appeal:**

**Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
17 January 2008 concerning maintenance of  
European patent No. 0915812 in amended form.**

**Composition of the Board:**

**Chairman:** G. Rath  
**Members:** J.-M. Schwaller  
C. Vallet

## Summary of Facts and Submissions

I. These appeals lie from the decision of the opposition division concerning maintenance of European patent No. 0 915 812 in amended form on the basis of the third auxiliary request filed during the oral proceedings of 11 December 2007, independent claims 1, 9 and 12 of which read as follows:

*"1. Flame attenuated pot and marble fiberized glass fibers exhibiting high chemical resistance, moisture resistance, and biosolubility, said glass fibers prepared from a glass composition consisting essentially of, in mol percent:*

<i>SiO<sub>2</sub></i>	<i>66 - 69.7</i>
<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>0 - 2.2</i>
<i>Alkaline earth metal oxide</i>	<i>7 - 18</i>
<i>Alkali metal oxide</i>	<i>9 - 20</i>
<i>B<sub>2</sub>O<sub>3</sub></i>	<i>0 - 7.1</i>

*said glass composition having a C(acid) defined by the ratio between the SiO<sub>2</sub> mol percent and the sum of the mol percents Al<sub>2</sub>O<sub>3</sub>, B<sub>2</sub>O<sub>3</sub>, alkaline earth metal oxide and alkali metal oxide  $\geq 1.95$ , a C(bio) defined by the ratio between the sum of the mol percents of SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> and the sum of the mol percents of B<sub>2</sub>O<sub>3</sub>, alkaline earth metal oxide and alkali metal oxide  $\leq 2.30$ , a C(moist) defined by the ratio between the sum of the mol percents of SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and B<sub>2</sub>O<sub>3</sub> and the sum of the mol percents of alkaline earth metal oxide and alkali metal oxide  $\geq 2.46$ , a difference,  $\Delta T$ , between HTV ( $10^3$  poise) defined by the  $10^3$  poise viscosity temperature and liquidus in excess of 194.44°C (350°F), and a biodissolution in excess of 150 ng/cm<sup>2</sup>/hr.*

9. Flame attenuated pot and marble fiberized glass fibers, said fibers having an outer shell depleted of a portion of volatile oxides, said fibers prepared from a glass composition comprising, in mol percent:

SiO <sub>2</sub>	66 - 69.0
Al <sub>2</sub> O <sub>3</sub>	0 - 2.2
Alkaline earth metal oxide	7 - 16
Alkali metal oxide	9 - 19
B <sub>2</sub> O <sub>3</sub>	0 - 7.1

and having a C(acid) defined by the ratio between the SiO<sub>2</sub> mol percent and the sum of the mol percents Al<sub>2</sub>O<sub>3</sub>, B<sub>2</sub>O<sub>3</sub>, alkaline earth metal oxide and alkali metal oxide  $\geq 2.00$ , a C(bio) defined by the ratio between the sum of the mol percents of SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> and the sum of the mol percents of B<sub>2</sub>O<sub>3</sub>, alkaline earth metal oxide and alkali metal oxide  $\leq 2.33$ , a C(moist) defined by the ratio between the sum of the mol percents of SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and B<sub>2</sub>O<sub>3</sub> and the sum of the mol percents of alkaline earth metal oxide and alkali metal oxide  $\geq 2.50$ , a difference  $\Delta T$  between HTV ( $10^3$  poise) defined by the  $10^3$  poise viscosity temperature and liquidus in excess of 166.67°C (300°F), and a biodissolution of greater than about 150 ng/cm<sup>2</sup>/hr.

12. An acid and moisture resistant, flame attenuated pot and marble fiberized glass fiber prepared from a glass composition consisting essentially of, in mol percent:

SiO <sub>2</sub>	66.5 - 67.8
Al <sub>2</sub> O <sub>3</sub>	0.5 - 1.5
B <sub>2</sub> O <sub>3</sub>	5 - 7.0
CaO	3.0 - 7.0
MgO	3.0 - 7.0
Na <sub>2</sub> O	14.0 - 17.0

$K_2O$

0.1 - 0.4

*wherein the sum of the mol percent of CaO and MgO is between about 8.0 and 12.0, said glass fiber exhibiting a difference,  $\Delta T$ , between HTV ( $10^3$  poise) defined by the  $10^3$  poise viscosity temperature and liquidus greater than  $222.22^\circ\text{C}$  ( $400^\circ\text{F}$ ) and a biodissolution greater or equal to about  $350\text{ ng/cm}^2/\text{hr}$ ."*

II. In the contested decision, the opposition division concluded that the above claims met the requirements of the EPC for the following reasons:

- The claimed fibers were novel because of their particular skin and core morphology, which was specific of fibers produced by pot and marble.
- The closest state of the art was represented by the fibers according to

D1: US 5 108 957,

which had the same composition as those claimed but were obtained differently, namely by a rotary process.

- The problem underlying the contested patent was to provide highly biosoluble fibers obtained by a pot and marble process.
- The glass fibers claimed were characterised by a composition having  $\Delta T$  higher than glass compositions fiberised in a rotary process.

- There was no reference in document D1 to the production of fibers by pot and marble process, so the selection of a specific glass from this document (for instance glass 5) required hindsight. The skilled person was further not aware from document D1 that a high biodissolution rate would be obtainable for pot and marble manufactured glass fibres, because of the morphological differences in comparison to fibers obtained a rotary process.
- III. With its statement of grounds of appeal dated 22 April 2008, the patent proprietor (hereinafter "appellant I") submitted a new main request, the claims of which were identical with those maintained by the opposition division.
- IV. With its statement of grounds of appeal dated 19 May 2008, the opponent (hereinafter "appellant II") inter alia raised objections under Article 100(a) EPC, alleging in particular a lack of inventive step of the subject-matter claimed over document D1.
- V. Observations from the parties were received as follows:
- Appellant I: by a letter dated 2 October 2008
  - Appellant II: by letters dated 21 October 2008 and 18 July 2011.
- VI. At the oral proceedings, which were held on 19 August 2011, the issue of inventive step was extensively dealt with. After discussion of the main request, appellant I submitted an auxiliary request, the admissibility of which was objected to by appellant II. Independent

claims 1 and 12 differed from the corresponding claims in the main request in that the glass composition was further defined to be "*free of phosphates*".

VII. The parties' requests are established as follows:

Appellant I/the patentee requests that the decision be set aside and that the patent be maintained on the basis of the claims filed as main request on 22 April 2008, or in the alternative, on the basis of the claims filed as auxiliary request at the oral proceedings before the board.

Appellant II/the opponent requests that the decision under appeal be set aside and the patent be revoked.

## **Reasons for the Decision**

### 1. *Main request - Novelty*

1.1 D1 discloses (column 1, lines 30 to 38) glass fibers formed by use of traditional fiber-forming techniques, such as centrifugation, which are quickly and readily degraded when placed in contact with a physiological medium. The glass fibers comprise the following components (D1, column 2, lines 12 to 30):

SiO<sub>2</sub>:            57 to 70 wt. %;  
CaO:             5 to 10 wt. %;  
Na<sub>2</sub>O + K<sub>2</sub>O:    13 to 16 wt. %;  
B<sub>2</sub>O<sub>3</sub>:            2 to 12 wt. %;  
Impurities:    less than 2 wt. %.

The fibers may further comprise one or more of the following additional components (in weight %):

Al<sub>2</sub>O<sub>3</sub>: 0 to 5 %;  
MgO: 0 to 5 %;  
F: 0 to 1.5 %;  
P<sub>2</sub>O<sub>5</sub>: 0 to 4%, but greater than 0.1% when the amount of Al<sub>2</sub>O<sub>3</sub> is greater than or equal to 1%.

1.2 The specific fibers according to Example 5 of D1 have the following composition (calculated in mol percent):

SiO<sub>2</sub>: 66.5;  
Al<sub>2</sub>O<sub>3</sub>: 1.2;  
RO (R = Ca + Mg) : 12.2;  
R<sub>2</sub>O (R = Na + K): 15.3;  
B<sub>2</sub>O<sub>3</sub>: 3.7.

This composition leads to the following (calculated) values for C (acid) = 2.1, C (bio) = 2.2 and C (moist) = 2.6.

The fibers according to Example 5 are further characterised by having a  $\Delta T$  (calculated from Table 5 and 6 in D1) of 229°C.

1.3 It follows that the sole difference between the subject-matter of the different independent claims at issue and the fibers according to Example 5 lies in the method of forming the fibers. In this respect, appellant I referred to paragraph [0020] of the contested patent and specified that the flame attenuated pot and marble process led to fibers structurally different from fibers produced by centrifugal or rotary processes, such as those known



from D1. Fibers produced by pot and marble were namely provided with an outer shell depleted of a portion of volatile oxides, while the fibers according to D1 did not have such a shell.

1.4 Therefore, the subject-matter of claim 1 of the main request is novel (Article 54(1) and (2) EPC).

2. *Main request - Inventive step*

2.1 The alleged invention relates to fiberglass products exhibiting enhanced biosolubility while maintaining other desirable properties and having been prepared from glass compositions suitable for fiberisation by the pot and marble process.

2.2 Regarding the starting point for assessing inventive step, the board considers D1 to represent the closest state of the art for the following reasons.

The board commented on D1 under points 1.1 to 1.3.

Appellant I explained that owing to the structural difference outlined under point 1.3, D1 would not represent the closest state of the art.

The board cannot accept this argument, because even if a structural difference exists between these two kinds of fibers, the fibers of D1 are described to be formed by "use of traditional fiber-forming techniques". So, even if the pot and marble fiberisation process is not explicitly mentioned in D1, this forming process is the sole other "traditional fiber-forming technique" on the market, since it is undisputed that only these two

techniques are traditionally used. Therefore, D1 is plainly suitable as the starting point for assessing inventive step.

2.3 Starting from this state of the art, appellant I - referring to paragraph [0004] of the patent in suit - argued that the problem to be solved was to provide glass fibers having improved properties as regards in particular their mechanical strength, resiliency, chemical resistance, moisture resistance and biosolubility.

2.4 As a solution to this technical problem the contested patent proposes glass fibers of the types defined in independent claims 1, 9 and 12, which all three are characterised in that the fibers have been fiberised by a flame attenuated pot and marble process.

2.5 The question is whether the problem identified under point 2.3 has actually been solved.

2.5.1 First of all, the board does not recognise any improvement in favour of the fibers prepared by pot-and-marble over those fibers disclosed in D1 for the following reasons.

Paragraph [0004] of the patent in suit, which tackles the properties mentioned in item 2.3, namely mechanical strength, resiliency, chemical resistance, moisture resistance and biosolubility, concerns the prior art, not the invention. This paragraph furthermore does not disclose any improvement, let alone any improvement over the fibers known from D1.

The contested patent also does not investigate any of the properties (resiliency and mechanical strength) on which the appellant's representative focused during the oral proceedings.

Comparative example 7/Table 5 of the patent in suit - which concentrates on example 6 of document D1 - also does not show any improvement as regards these specific properties.

Also, appellant I did not provide any experimental data confirming its allegations regarding the so-called "improved properties".

2.5.2 According to the patent in suit (paragraph [0009] "Summary of the invention"), it has been *"surprisingly discovered that glass fibers of enhanced biosolubility may be prepared from glass compositions suitable for pot and marble processing, which exhibit minimally about a 350°F difference in HTV and liquidus, and which have well defined formulations meeting both narrow mol percentage composition as well as meeting each of three specific "C-ratios" which govern chemical resistance, moisture resistance, and biosolubility."*

So, the contested patent concentrates on the same properties as document D1 (column 4, lines 19 to 27), namely the biosolubility and the chemical and hydrolytic resistance of the glass fibers.

2.5.3 It follows that, in the absence of any improvement, the problem to be solved in the light of D1 has to be reformulated in less ambitious terms, namely as

providing further biosoluble, chemically and moisture resistant glass fibers.

2.5.4 The board is satisfied that this problem has effectively been solved, as the contested patent contains enough examples - in particular examples 1, 2 and 3 - showing that biosoluble fibers having the required properties can be produced by the flame attenuated pot and marble process (see table 2).

2.6 It remains to be decided whether the proposed solution (under point 2.4) is obvious in view of the state of the art.

The skilled person starting from the glass fibers known from document D1 and faced with the problem defined under point 2.5.3 would in the board's opinion arrive in an obvious manner at the subject-matter of claim 1 at issue, for the following reasons.

As indicated in items 1.1 and 1.2 above, document D1 discloses biosoluble, chemically and moisture resistant glass fibers, the composition of which falls under the wording of claim 1, inclusive the C (acid), C (bio) and C (moist) values.

D1 further describes that the above biodegradable fibers were formed by use of traditional fiber-forming techniques, such as centrifugation. The glass compositions to be fiberised in D1 were preferably those which had the following characteristics:

- a viscosity of 1000 cps at a temperature lower than about 1200°C (D1, column 2, lines 57 to 60)

*(The board observes that this feature corresponds to the HTV ( $10^3$  poise) defined in claim 1 at issue) and*

- a difference between the temperature at which the viscosity of 1000 cps was achieved and the liquidus temperature of greater than about 50°C (column 3, lines 4 to 6) *(The board observes that this feature corresponds to the  $\Delta T$  defined in claim 1 at issue).*

The  $\Delta T$  of the glass compositions described in Table 6 of D1 varies from 122°C (glass no. 7) to 264°C (glass no. 8), and the specific glass composition of example 5 of document D1 is characterised by having a  $\Delta T$  of 229°C.

In view of the above and bearing in mind that it was common general knowledge at the priority date (see paragraphs [0005] to [0008] of the patent in suit) that there were only two principal methods of glass wool fiber production: the rotary spinning process and the process by flame attenuation (pot and marble), and that a high  $\Delta T$  was a prerequisite for a smooth working of a flame attenuation pot and marble fiberisation process, the skilled person seeking for an alternative fiber glass to those of D1 finds in this document all the ingredients for arriving in an obvious way at the subject-matter of claim 1 at issue.

First of all, the glass compositions disclosed in D1 fulfill all the criteria for obtaining biosoluble and chemically and moisture resistant glass fibers. Furthermore the glass composition of Example 5 has a

high  $\Delta T$ , which means that it is optimally designed for achieving a smooth working of the flame attenuation pot and marble fiberisation process. In this context, the skilled person, who knows that this is the key criteria for fiberising a glass composition by the flame attenuation pot and marble process, **would** inevitably try to fiberise this composition by this (sole) other fiberising process with the expectation of getting a glass fiber having similar properties to those of the rotary spun-glass fiber according to example 5 of D1.

Appellant I argued that this reasoning was based on an ex-post-facto analysis and that the skilled person could not arrive at the subject-matter of claim 1 starting from D1, because - as explained in paragraphs [0008] and [0020] of the contested patent - of the huge impact on the biosolubility of the highly resistant shell existing on the surface of pot and marble fibers as a result of the flame attenuation and consequent loss of volatile oxides from the fiber surface. This shell was expected to lower the measured biodissolution rate of a pot and marble fiber by a factor of about 2 to 4 and so, the skilled person could not expect a high biosolubility for the fibers known from D1.

The board cannot accept this argument because even if the skilled man was aware of a certain difficulty of solubilising fibers obtained by pot and marble, there is a strong incentive in D1 to try this fiberisation technique, since D1 (column 3, lines 4 to 7) specifically focuses on composition having a  $\Delta T$  of 50°C or higher. As explained above, a high  $\Delta T$  is specifically the key feature for a good working of the fiberisation technique used in the contested patent.

So, the skilled person trying this technique on the glass composition according to D1 would directly arrive at a fiber falling within the terms of claim 1 at issue, which therefore lacks the requirements of Article 56 EPC.

It follows that the main request is not allowable.

3. *Auxiliary request - admissibility*

3.1 At the oral proceedings, appellant I amended the claims so as to introduce the feature "free of phosphates" in independent claims 1 and 12. Independent claim 9 remained unamended.

Appellant II argued that this new request was not admissible because it was belated and furthermore, it raised new issues which had never been brought to discussion before.

3.2 The board observes that the three independent claims 1, 9 and 12 of the new auxiliary request have not been amended in a uniform way. This raises the question which feature in each independent claim is essential for solving the problem at the basis of the contested patent. The question also arises whether each of these features contributes to the technical solution or whether their combination is at stake.

3.3 In view of these new issues that the amended claims submitted at this late stage in the appeal proceedings raises, the board exercises its power of discretion (Article 13(1), (3) RPBA) and decides not to admit the amended claims into the proceedings. In this respect,

the board observes that it is established case law of the boards of appeal that when new claims are submitted, these should be clearly allowable in the sense that they do not introduce new objections under the EPC and overcome all outstanding objections (T 1126/97 (not published in the OJ EPO), point 3.1.2 of the reasons). The amended claims should also not raise new issues which would require a further written phase in order to be properly dealt with (T 81/03, point 2.4 of the reasons).

- 3.4 As the claims of the present auxiliary request clearly do not fulfil the conditions set out in the above decisions, none of the requests is allowable.

## **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