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Datasheet for the decision of 11 June 2013

Case Number: T 0538/10 - 3.3.03

Application Number: 02028733.0

Publication Number: 1293519

IPC: C08F 8/20, C08F 12/16

Language of the proceedings: EN

Title of invention:
Brominated polystyrenic resins

Patent Proprietor:
ALBEMARLE CORPORATION

Opponent:
Bromine Compounds Ltd

Headword:
-

Relevant legal provisions:
EPC Art. 83

Keyword:
"Sufficiency of disclosure - all requests (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0538/10 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 11 June 2013

Appellant: (Opponent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 27 January 2010 concerning maintenance of the European patent No. 1293519 in amended form.

Composition of the Board:

Chairman: B. ter Laan
Members: O. Dury
C. Vallet

Summary of Facts and Submissions

I. The appeal by the opponent lies against the decision of the opposition division posted on 27 January 2010 to maintain in amended form European patent No. EP 1 293 519, based on application N°. 02 028 733.0, which is a divisional application of the earlier European patent application 98 914 612.1.

II. The granted patent was based on 11 claims of which claims 1, 9 and 10 read:

"1. Brominated polystyrene which has a TGA temperature for 1% weight loss which is 340°C or higher".

"9. Brominated polystyrene of any of claims 1 to 8 wherein the brominated polystyrene has a ΔE value of less than 20."

"10. Brominated polystyrene of claim 9 wherein said ΔE value is within the range of from 5 to 15."

III. A notice of opposition against the patent was filed on 19 September 2006, in which the revocation of the patent in its entirety was requested on the grounds of Art. 100 (a) EPC (lack of novelty as well as lack of an inventive step). The ground of opposition according to Art. 100 (b) EPC was addressed for the first time by the opponent in a letter dated 28 January 2008 (pages 2 and 4). That issue was further discussed during the oral proceedings of 3 December 2009 before the opposition division and decided upon in the contested decision.

IV. In the decision under appeal the opposition division held, *inter alia*, that the main request filed with letter of 30 September 2009 fulfilled the requirements of Art. 83 EPC. The opposition division considered in particular that the methods of determination of the TGA temperature (thermogravimetric analysis) and the ΔE value were sufficiently disclosed in the patent in suit and that there was no evidence on file showing that it was not possible to carry out the invention over the whole scope of the claims.

V. On 12 March 2010, the opponent (appellant) lodged an appeal against the above decision. The prescribed fee was paid on the same day. In their statement of grounds of appeal filed on 25 May 2010 the appellant requested that the decision of the opposition division be set aside and the patent in suit be revoked in its entirety.

Further arguments as well as means of proof were filed by letters dated 20 December 2012, 10 May 2013 and 6 June 2013.

VI. By letter dated 5 October 2010 the patent proprietor (respondent), requested that the patent be maintained on the basis of either the main or the (first) auxiliary request filed with letter dated 30 September 2009 or on the basis of a second auxiliary request filed with letter of 5 October 2010. A new main request and four auxiliary requests were filed as replacement of all former requests by letter dated 20 December 2012. By letter of 10 May 2013 amended auxiliary requests 2 and 3 as well as an additional auxiliary request 5 were filed.

Claim 1 of the main request read as follows:

"1. Brominated polystyrene which has a TGA temperature for 1% weight loss which is 340°C or higher, and which has a ΔE value within the range of from 5 to 15."

Claim 1 of auxiliary request 1 was identical to claim 1 of the main request.

Claim 1 of each of auxiliary requests 2 and 3 corresponded to claim 1 of the main request and of auxiliary request 1, respectively, wherein the method of determination of each of the parameters TGA and ΔE was further specified.

Claim 1 of auxiliary request 4 read (amendments as compared to claim 1 of the main request are indicated in **bold**):

"1. Brominated polystyrene which **contains less than 100 ppm of Cl and** has a TGA temperature for 1% weight loss which is **within the range of from 345°C to 380 °C** and which has a ΔE value within the range of from 5 to 15."

Claim 1 of auxiliary request 5 corresponded to claim 1 of auxiliary request 4, wherein the method of determination of each of the parameters TGA and ΔE was further specified.

VII. In a first communication issued on 25 October 2012 the Board identified issues related to Art. 76 EPC and Art. 123(2) EPC.

In a further communication accompanying the summons to oral proceedings, issues to be discussed at the oral proceedings were specified. Regarding sufficiency of disclosure, it was *inter alia* pointed out (point 5.1.2) that, considering examples VI and VII of the patent in suit, it appeared questionable if the information provided by the patent in suit was sufficient to put the skilled person into a position to prepare, with a good chance of success, brominated polystyrene according to the claims.

VIII. Oral proceedings were held on 11 June 2013 in the presence of both parties.

IX. The appellant's arguments relevant for the present decision may be summarised as follows:

Main request

Sufficiency of disclosure

(a) During the proceedings, the respondent had consistently argued that one of the essential features required to prepare a brominated polystyrene having both a TGA and a ΔE value according to claim 1 was that the bromine: polystyrene feed molar ratio should be within a specific range. The respondent had further explained that when a feed ratio outside that range was used, ΔE values higher than 15 were obtained as shown by examples VI and VII of the patent in suit. However, the criticality of the bromine: polystyrene feed molar ratio in order to

obtain ΔE values specified in claim 1 was not derivable from the patent in suit.

(b) Examples I and IV-VII could not serve to demonstrate that the bromine : polystyrene feed molar ratio had an impact on the ΔE value of the brominated polystyrene because those examples differed from each other in several features.

(c) The argument of the respondent that working within a bromine: polystyrene ratio in-between those of examples I and V of the patent in suit resulted in brominated polystyrene according to claim 1 was not in accordance with the information of the patent in suit. According to the calculation of the appellant, the bromine : polystyrene ratio of example I was lower than that of example VII. Also, the use of almost identical bromine : polystyrene feed molar ratios resulted once in a brominated polystyrene with a ΔE according to claim 1 (example IV), but another time it did not (example VII).

(d) Considering that examples VI and VII were performed according to the teaching of the patent specification paragraph [0034] but resulted in products not according to the claims, examples I, IV and V did not provide sufficient basis for a generalisation.

(e) From the data contained in the patent in suit the skilled person could only reproduce the invention by chance. It was in particular not indicated which parameters of the raw starting polystyrene

were necessary for obtaining brominated polystyrene according to claim 1.

(f) Hence, the patent in suit did not provide sufficient information to carry out the claimed invention without undue burden.

Auxiliary requests 1-5

(g) The same arguments as for the main request were valid for each of auxiliary requests 1-5.

X. The respondent's objections relevant for the present decision were essentially as follows:

Main request

Sufficiency of disclosure

(a) The description of the patent in suit disclosed many details and indicated the features essential for carrying out the invention. Examples I, IV and V, according to the invention, further showed three ways of preparing brominated polystyrenes according to claim 1. Examples VI and VII showed two ways not leading to products according to claim 1. Those results read in combination with the general teaching of the patent specification provided enough guidance in order to prepare successfully the compounds claimed.

(b) The fact that both the bromine : polystyrene feed molar ratio and the mixing apparatus were essential features of the invention was derivable

from a comparison of examples I, IV and V (illustrative of the invention) with examples VI and VII (both not according to the invention). The bromine: polystyrene feed molar ratio was explicitly indicated in examples V and VI and could be calculated for examples I, IV and VII. The comparison of the bromine: polystyrene feed molar ratio and ΔE values for those examples showed that there was an optimum range for the bromine : polystyrene feed rate ratio within which brominated polystyrene having ΔE values within the range defined in claim 1 were obtained.

(c) The information provided in the patent in suit was sufficient to ensure repeated success in carrying out the invention, even though attempts to prepare the claimed brominated polystyrene might be accompanied by a number of failures.

(d) Therefore the requirements of Art. 83 EPC were met.

Auxiliary requests 1-5

(e) The same arguments as for the main request were valid for each of auxiliary requests 1-5.

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

The respondent (patent proprietor) requested that the appeal be dismissed and that the patent be maintained in amended form according to either

- the main request or auxiliary request 1, both filed with letter of 20 December 2012, or on the basis of
- auxiliary requests 2 or 3, filed with letter of 10 May 2013, or on the basis of
- auxiliary request 4 filed with letter of 20 December 2012 or
- auxiliary request 5 filed with letter of 10 May 2013.

XII. The Board announced its decision at the end of the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. Sufficiency of disclosure

2.1 The ground of opposition according to Art. 100(b) EPC was first mentioned during the opposition proceedings in a letter of the opponent dated 28 January 2008, well after termination of the nine months deadline according to Art. 99 EPC. It does not appear from either the minutes of the oral proceedings before the opposition division or the contested decision whether or not the question of the admission of that new ground of opposition was addressed during the opposition proceedings. However, there can be no doubt that the issue of sufficiency according to Art. 83 EPC was discussed during the oral proceedings before the

opposition division and decided upon in the contested decision (section 2 of the reasons of the contested decision; section 4 of the minutes of the oral proceedings). The opposition division has therefore *de facto* admitted the ground according to Art. 100(b) EPC into the proceedings. This has not been challenged on appeal by either of the parties. Hence, the ground of opposition according to Art. 100(b) EPC forms part of the present appeal proceedings.

2.2 Claim 1 is directed to a brominated polystyrene which is characterised by a specific combination of two parameters, namely TGA and ΔE, each of which being within a specific range.

2.3 The first sentence of paragraph [0042] of the patent in suit, above which the title "Production of Brominated Polystyrenes of This Invention" is indicated, reads: "The brominated polystyrenes of this invention are not conventionally produced". That statement is directly followed by the indication of measures to be taken in order to prepare those compounds by bromination of a polystyrene reactant (paragraphs [0042] to [0063] of the patent in suit). Information is given in particular regarding:

- the polystyrene reactant: according to paragraph [0045], read in combination with paragraph [0018], any commercially available polymer may be used. However, polystyrenes having an average molecular weight by weight of 500-100.000, preferably 100.000 to 300.00 and a polydispersity of 1 to 4, preferably 1.25 to 2.5 are recommended, Styron® 612 being a most preferred polystyrene;

- the brominating agent, which is preferably bromine (paragraphs [0048] and [0051]);
- the molar ratio brominating agent : styrenic monomers, which is preferably from 2.5 to 5 (paragraph [0050]);
- the solvent, which is preferably bromochloromethane (paragraph [0052]);
- the catalyst, which is preferably $AlCl_3$ (paragraph [0047]);
- the process step of mixing the polystyrene reactant and brominating agent without bromination catalyst (paragraphs [0042] and [0058]);
- the preferred process step of i) forming a solution of the styrenic polymer and the solvent bromochloromethane so as to facilitate its admixture to bromine (paragraph [0054]) and ii) mixing the bromination catalyst in the solvent bromochloromethane (paragraph [0055]);
- the process feature of working under anhydrous conditions (paragraphs [0052]-[0053]);
- the reaction temperature, which is from 0°C to 10°C, most preferably from 0°C to 5°C (paragraphs [0042] and [0057]-[0058]).

Indications on how to carry out the process are then provided in paragraphs [0058]-[0063].

2.4 That information is completed by the following examples:

- Examples I, IV and V, all illustrative of the invention and which all disclose the preparation of brominated polystyrenes according to claim 1;
- Examples II and IIIA-B, which are comparative examples according to the prior art (US 5 532 322),

as indicated in paragraph [0035], and which lead to brominated polystyrenes not according to claim 1;

– Examples VI and VII, which both deal with the preparation of brominated polystyrenes having a ΔE value of 18.34 or 16.44, respectively, i.e. higher than the maximum value of 15 defined in claim 1. The TGA is not indicated.

It is not explicitly indicated in the specification if examples VI and VII are illustrative of the invention. However, they were conducted according to the teaching of the patent in suit, in particular in respect of all the technical features identified in section 2.3 above. That finding was not contested by the parties and was further confirmed by the fact that, upon a question by the Board during the oral proceedings, the respondent could not identify a single feature of the process used in examples VI and VII that would not be in agreement with the teaching of the patent in suit.

Although the nature of the polystyrene used in examples VI and VII is not indicated, paragraph [0018] sets no limitation regarding the nature of the polystyrene reactant. As a matter of information, the respondent confirmed (letter dated 5 October 2010: page 6, first paragraph) that the polystyrene reactant used in examples VI and VII was Styron® 612 i.e. the most preferred embodiment for the polystyrene reactant, as specified in paragraph [0045]. This also corresponds to the polystyrene reactant used in examples IV and V.

Under these circumstances, examples VI and VII of the patent in suit both show that following the teaching of the patent in suit, even its preferred embodiments,

does not mandatorily lead to a brominated polystyrene as defined in claim 1, in particular a brominated polystyrene having a ΔE within the range defined therein.

2.5 The respondent argued that it was derivable from examples I and IV-VII that the bromine : polystyrene feed molar ratio had to be kept within a specific range in order to obtain a brominated polystyrene having a ΔE value within the range defined in claim 1.

2.5.1 However, the reaction conditions used in examples I and IV-VII differ in more than one feature, not only the bromine: polystyrene feed molar ratio. As summarised e.g. in the document filed by the appellant during the oral proceedings before the Board and not contested by the respondent, the following differences can be identified:

- the proportion of catalyst used in example VI (2 wt.%) as compared to examples I, IV, V and VII (0.2 wt.%);
- the nature of the polystyrene used in example I (Polytex) as compared to examples IV and V (Styron® 612). The information that examples VI and VII were performed using Styron® 612 was not available in the application as filed and can therefore not be taken into account for the assessment of sufficiency of disclosure;
- the feed rates used in each example;
- the feeding of the reactant (constant in examples I and V-VII; sequential in example IV);
- the feeding device used in example VII as compared to that used in examples I, IV and V, which,

according to the respondent, affected the quality of the brominated polystyrene thus produced (letter of 5 October 2010: last paragraph on page 3 to top of page 4).

Therefore no direct comparison can be made between those examples. It can in particular on the basis of those examples not be concluded that there is a relationship between the bromine : polystyrene feed molar ratio and the ΔE value of the brominated polystyrene prepared.

2.5.2 In addition, all of examples I and IV-VII were performed using a bromine: polystyrene molar feed rate within the feed range of 2.5 to 5 moles indicated as the preferred range in paragraph [0050] of the patent in suit. Independent of the method considered by the parties to calculate the bromine : polystyrene feed molar ratio (letter of the respondent dated 10 may 2013: Table on page 5; pages 1 to 3 of the document filed by the appellant during the oral proceedings before the Board), the calculated value was within that preferred range.

The specification of the patent in suit contains no teaching that the bromine : polystyrene feed molar ratio is in any way related to the colour properties of the brominated polystyrene, in particular ΔE. In the absence of any such guidance, the skilled person would therefore expect, in particular because the products are "not conventionally produced", that carrying out a process according to the preferred embodiments disclosed in the specification would lead to the preferred brominated polystyrene, i.e. having a ΔE

value according to claim 1. Examples VI and VII show that this is not the case.

2.5.3 Under such circumstances, the argument of the respondent according to which the examples of the patent in suit showed that an optimum range of bromine: polystyrene feed molar ratio was to be respected in order to obtain a ΔE as defined in claim 1, is based on information that was not derivable from the patent in suit, respectively the application as filed. Therefore, that argument can not be followed.

2.6 There is also no information in the patent in suit which features of the processes used in examples VI and VII should be changed in order to produce the brominated polystyrene now being claimed.

Since the bromine: polystyrene feed molar ratios used in examples IV and VII are almost identical (2.69 versus 2.70) they cannot be seen as significantly different. However, example IV leads to a brominated polystyrene having a ΔE within the range defined in claim 1, whereas example VII does not. No explanation was provided by the respondent in that respect. Hence, even if examples IV and VII could be compared, which is not the case, the argumentation of the respondent regarding the criticality of the bromine : polystyrene feed molar ratio cannot be followed.

2.7 Even when the patent in suit provides three examples showing the preparation of products as claimed (examples I, IV and V), in view of the fact that two of the five examples performed according to the teaching of the patent in suit lead to products outside claim 1,

this is not sufficient to support a general guidance of how reliably to prepare the claimed products.

2.8 In view of the above, the main request does not meet the requirements of Art. 83 EPC and has to be refused.

Auxiliary requests 1-5

3. Claim 1 of each of auxiliary requests 1-5 comprises a combination of parameters TGA and ΔE as in claim 1 of the main request, the same range of ΔE being specified as in the main request. Following the same reasoning as for the main request, none of auxiliary requests 1-5 complies with the requirements of Art. 83 EPC.

4. Since none of the requests of the respondent (patent proprietor) is allowable, the patent in suit has to 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:

E. Görgmaier B. ter Laan