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**Datasheet for the decision
of 19 December 2006**

Case Number: T 0204/04 - 3.3.09

Application Number: 96934804.4

Publication Number: 0858477

IPC: C08J 9/14

Language of the proceedings: EN

Title of invention:

A method of making insulating rigid polyurethane foams

Patentee:

BASF CORPORATION

Opponent:

Bayer MaterialScience AG

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56

Keyword:

Late filed document (inadmissible) - not prima facie relevant"
"Fresh ground for opposition (considered) - approval of
patentee"
"Main request: novelty (no)"
"Auxiliary request: novelty, inventive step (yes)"
"Remittal for further prosecution"

Decisions cited:

G 0010/91, T 1002/92

Catchword:

-



Case Number: T 0204/04 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 19 December 2006

Appellant: Bayer MaterialScience AG
(Opponent) Patents and Licensing
D-51368 Leverkusen (DE)

Representative: -

Respondent: BASF CORPORATION
(Patent Proprietor) 3000 Continental Drive North
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Representative: Bieller, Vera
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 4 December 2003
rejecting the opposition filed against European
patent No. 0858477 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: P. Kitzmantel
Members: N. Perakis
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. Mention of the grant of European patent No 0 858 477 in respect of European patent application No 96934804.4 in the name of BASF CORPORATION, which had been filed on 24 October 1996 claiming three US priorities all of 1 November 1995 (US 548362, US 551507 and US 551658), was announced on 7 July 1999 (Bulletin 1999/27). The patent, entitled "A method of making insulating rigid polyurethane foams", was granted with twenty five claims, method Claims 1 to 23 and product Claims 24 and 25. Independent Claims 1, 24 and 25 read as follows:

"1. A method of making a polyisocyanate based rigid closed cell foam comprising reacting an organic isocyanate with a polyol composition comprising at least:

a) an aromatic amine initiated polyoxyalkylene polyether polyol having an hydroxyl number of 200 meq polyol/g KOH or more;

b) an aliphatic amine initiated polyoxyalkylene polyether polyol having an hydroxyl number of 200 meq polyol/g KOH or more in an amount of 10 weight percent or less based on the weight of the polyol composition; and

c) cyclopentane

wherein the cyclopentane is dissolved in the polyol composition."

"24. A polyisocyanate based rigid all foam, obtainable as claimed in claim 1."

"25. A storage stable polyol composition comprising at least:

a) an aromatic amine initiated polyoxyalkylene polyether polyol having an hydroxyl number of 200 meq polyol/g KOH or more;

b) an aliphatic amine initiated polyoxyalkylene polyether polyol having an hydroxyl number of 200 meq polyol/g KOH or more in an amount of 10 weight percent or less based on the weight of the polyol composition; and

c) cyclopentane;

wherein the cyclopentane is dissolved in the polyol composition."

Claims 2 to 23 were dependent, directly or indirectly, on Claim 1.

II. A Notice of Opposition was filed against this patent by Bayer AG (now Bayer MaterialScience AG) on 7 April 2000. The Opponent requested the revocation of the patent in its full scope, relying on Article 100(a) EPC (lack of novelty of Claim 25 and lack of inventive step of Claims 1-25), Article 100(b) EPC (insufficiency of the disclosure of the claimed invention) and Article 100(c) (extension of the subject-matter of granted Claim 1 beyond the content of the originally filed application).

The Opposition was *inter alia* supported by the following documents:

D1: Yoshimura *et al*, "An Insight into the Characteristics of a Nucleation Catalyst in CFC-free Rigid Foam Systems", Polyurethanes 94, Proceedings of the Polyurethanes 1994 Conference, The Society of the Plastic Industry Inc.

D2: WO-A-94/03515

D4: EP-A-0 421 269

III. By its decision orally announced on 14 October 2003 and issued in writing on 4 December 2003 the Opposition Division rejected the opposition.

The Opposition Division held in the appealed decision that the requirements of Article 83 EPC were met, as the patent specification disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a skilled practitioner.

The Opposition Division further acknowledged the novelty of the claims, especially that of Claim 25, over the cited state of the art, in particular D1, because according to that disclosure the cyclopentane was emulsified and not dissolved in the polyol composition.

Insofar the late filed document D4 was concerned, according to the minutes of the oral proceedings this was not admitted into the opposition procedure, and is not mentioned in the decision.

Concerning inventive step, the Opposition Division decided that the claimed subject-matter was not obvious. In its view, the skilled person starting from D1 and aiming at the production of a closed-cell rigid polyurethane foam, which was dimensionally stable and had good thermal insulation properties, would not have considered a reduction of the amount of the aliphatic amine initiated polyoxyalkylene polyether polyol, because it could be not expected that, in the case of such a reduction, the cyclopentane would be fully dissolved in the polyol composition.

D2 would not have been taken into consideration because it failed to disclose an aromatic amine initiated polyoxyalkylene polyol.

- IV. On 10 February 2004 the Opponent (Appellant) lodged an appeal against the decision of the Opposition Division and paid the appeal fee on the same day.

In the Statement setting out the Grounds of Appeal filed on 13 April 2004, the Appellant maintained the lack of novelty objection against the subject-matter of Claim 25 in view of D1 and D4 and raised for the first time a lack of novelty objection against the subject-matter of Claim 24. It maintained its inventive step objection against the subject-matter of Claims 1 and 25 taking D1 as the closest state of the art, arguing that the use of a smaller amount of aliphatic amine initiated polyol did not solve any technical problem in a non-obvious manner. It further argued that even if it was recognized that the problem to be solved was the

provision of a storage-stable polyol composition, the claimed solution was obvious in view of D1.

- V. The Respondent argued that the appeal was not properly founded because, as compared to the first instance opposition proceedings, no new arguments were put forward. As to the merits of the case, it maintained that the subject-matter of Claims 1, 24 and 25 were novel over D1 and/or D4.

While the Respondent also argued that the patent as granted related to non-obvious subject-matter, it also submitted with the letter dated 24 November 2006 a set of claims for an auxiliary request corresponding to the granted claims with product Claim 24 being deleted.

- VI. With a facsimile received on 23 November 2006 the Appellant announced that it would not participate in the oral proceedings and requested a decision to be taken according to the state of the file.

- VII. On 19 December 2006 oral proceedings were held before the Board in the absence of the Appellant.

- VIII. The arguments put forward by the Appellant in its written submissions can be summarized as follows:

- The subject-matter of Claim 25 lacked novelty in view of D1, table 5, column 3, which disclosed a two-phase polyol composition comprising at least 7 wt % of cyclopentane.
- The subject-matter of Claim 25 lacked novelty also in view of the process disclosed in column 10 of D4.

- The subject-matter of Claim 24 lacked novelty over D1 because the foam, defined as the product obtained by the process according to Claim 1 in which the polyol composition was a solution, could not be distinguished from the foam obtained by the process of D1, in which the polyol composition was an emulsion. The technical data of D1 showed that the difference in the state of the polyol composition, ie solution or emulsion, did not lead to any difference in the pore dimension of the foam or in its thermal insulation property.
- The subject-matter of Claims 1 and 25 lacked an inventive step over D1, because the difference in the amount of component (b) in the polyol composition did not solve any technical problem in a non-obvious manner.
- D1, table 5 showed that the use of more than 10 wt % and less than 10 wt % of component (b) in the polyol composition led to foams of identical physical properties.
- Even if the technical problem to be solved was considered to be the provision of a storage stable polyol composition, its solution by reducing the amount of cyclopentane down to the amount that was fully dissolved in the polyol composition would have been obvious to the skilled person.

IX. The arguments put forward by the Respondent in its written submissions and at the oral proceedings can be summarized as follows:

- The subject-matter of Claims 1 and 25 related to a storage stable polyol composition with a specific ratio of components a) and b) and with cyclopentane in such an amount that it was fully dissolved in the polyol composition. Consequently the claimed invention was disclosed in a manner sufficiently clear and complete to be carried out by a skilled person in the art.

- The subject-matter of Claims 1 and 25 of the main request was new over D1 and D4 because the cyclopentane was fully dissolved in the polyol composition and did not form an emulsion.

- The subject-matter of Claim 24 of the main request was novel over D1 because the allegations of the Appellant were not supported by D1 and because there was a structural difference between the claimed foams and those disclosed in this document.

- The subject-matter of the claims involved an inventive step over D1, the closest state of the art. The technical problem to be solved was to make a storage-stable polyol solution. The solution of the technical problem was achieved by controlling the amount of the cyclopentane such that it was fully soluble in the polyol composition. This problem solution was not obvious in view of D1, which rather taught an increase in the amount of the aliphatic amine initiated polyoxyalkylene polyether polyol.

- X. The Appellant requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

The Respondent requested that the appeal be dismissed or alternatively that the patent be maintained on the basis of Claims 1 to 24 of the first auxiliary request.

Reasons for the Decision

1. The appeal is admissible.
2. Admissibility of a late filed document

The Board, following the established case law (see T 1002/92, OJ 1995, 605) with regard to the late filing of documents, decided not to admit D4 into the procedure because it did not satisfy the criterion of *prima facie* relevance required to support the lack of novelty objection raised against the subject-matter of Claim 25. The Board notes that neither the passage specified by the Appellant (column 10) nor any other part of D4, explicitly or implicitly, discloses a storage stable polyol composition to be used in the preparation of polyurethane foams, which comprises the claimed polyol components a) and b) in the claimed ratio and in which the cyclopentane is fully dissolved.

3. Admissibility of a fresh ground for opposition in appeal

The Board, following the principle set out in G 10/91 (OJ EPO 1993, 420, point 18), has decided to consider

the fresh ground of lack of novelty, raised for the first time in the Grounds of Appeal against the subject-matter of Claim 24, because the Respondent (Patentee) gave its approval thereto at the oral proceedings held before the Board.

4. Main request

The main request corresponds to the granted Claims 1 to 25.

4.1 Definition of the polyol composition

The Board construes the polyol composition of Claims 1 and 25 to comprise only such amounts of cyclopentane as are fully dissolved therein. The Board has come to this conclusion on the basis of the wording used in the claims, which is "wherein the cyclopentane is dissolved in the polyol composition". This does not allow any other interpretation.

4.2 Novelty under Article 54 EPC

The Board considers that the polyurethane foam of Claim 24, which is defined by its preparation method, lacks novelty over the polyurethane foam disclosed in D1, table 5, third column, because this process feature cannot establish a difference.

The disclosed foam, like the one claimed, is manufactured by reacting a polyisocyanate with a polyol composition comprising at least two types of polyols in a specific mass ratio and cyclopentane, a blowing agent. The only difference between the method of the patent in

suit and that of D1 is that the polyol composition of the patent in suit comprises cyclopentane only in dissolved form, whereas the polyol composition of D1 comprises cyclopentane also partly in emulsified form. This difference, however, does not entail any difference in the foams obtained.

First of all, the wording of Claim 24 does not provide any structural differentiation of the claimed foam from that disclosed in D1. Nor has the Respondent been able to point to any structural difference either in the written appeal phase or the oral proceedings before the Board.

Furthermore, as regards the technical evidence available, no effect on the properties of the foams can be detected which is caused by the different form (ie phase) in which the cyclopentane is used as between D1 and the claimed invention.

While the very small difference between the blowing agent content of the polyol compositions according to D1 (table 5, third column: 15 parts of 98% cyclopentane) and according to Examples 1 to 3 of the patent in suit (table 1, eighth line; page 12, lines 5-6: 14 parts technical grade 70% cyclopentane - the 30% balance necessarily being further physical blowing agent) leads according to D1 to the formation of an emulsion, given the width of the reaction conditions permitted by the claimed invention, these slightly different amounts of blowing agent cannot, in the Board's judgment, lead to a difference in the structure (eg density) of the respectively resulting foam.

Furthermore, it is established by the data in table 5 of D1 that the difference in the phase (emulsion or solution) in which the cyclopentane is present in the polyol composition does not lead to significantly different properties (including foam density, thermal conductivity (K-factor) and cell size) of the resulting foams.

It follows, that the foam of Claim 24 cannot be distinguished from the foam of D1, table 5, third column, either on the basis of its structure or on the basis of its properties.

This conclusion is not invalidated by the argument of the Respondent that the skilled person would be able to find out by known analysis techniques whether or not the starting polyol composition comprised an amount of cyclopentane, which would not have been fully soluble therein. The reason is that this would require an *ex-post* determination of the reaction and foaming conditions, including the amounts of vaporised and gaseous (ie carbon dioxide resulting from the isocyanate/water reaction) blowing agents as well as the kind of catalysis and the foaming adjuvants used. This cannot reasonably be considered realistic in the light of the fact that the structure and the mechanical/physical and thermal foam properties are unspecific with regard to the use of cyclopentane in either completely dissolved or, additionally, partly emulsified form.

Nor is this conclusion affected by the absence of technical evidence provided by the Respondent, as criticised by the Appellant, because it directly

follows from a factual comparison of the information in D1 with the subject-matter of Claim 24.

Since Claim 24 of the main request lacks novelty this request is not allowable.

5. Auxiliary request

The auxiliary request corresponds to the granted claims with the exception of Claim 24 and the consequential renumbering of Claim 25.

5.1 Novelty under Article 54 EPC

The subject-matter of Claims 1 and 24 is novel over the disclosure of D1, table 5, column 3, since the disclosed polyol composition is an emulsion, whereas the claimed composition is a solution.

5.2 Inventive step under Article 56 EPC

D1 (page 301, left-hand column, lines 46-52; page 301, table 2; page 308, lines 10-18; page 309, table 5) is the closest state of the art. It discloses polyol compositions comprising cyclopentane in emulsified form for the manufacture of polyurethane foams with reduced cell size and decreased thermal conductivity. The polyol composition is an emulsion because of the poor solubility of cyclopentane in the aromatic amine-based polyether polyol component (page 302, left-hand column, lines 3-17; page 302, right-hand column, lines 16-18). Table 5 comprises polyol compositions obtained by varying the blending ratio of the aromatic amine-based polyol (page 308, lines 11-14) in the polyol

composition while maintaining constant the amount of cyclopentane. From the disclosed polyol compositions of table 5, that of column 3 is the closest to the claimed polyol composition because it comprises a mixture of aliphatic and aromatic amine initiated polyols falling within the claimed definition.

The polyol composition of either Claim 1 or 24 differs from the above mentioned polyol composition of D1 only in the amount of the cyclopentane involved, which according to the claimed subject-matter is so selected that it is fully dissolved in the polyol composition, leading to a storage-stable composition.

The technical problem underlying the present invention is the provision of a polyol composition in which cyclopentane is soluble, which is thus storage-stable, and of a dimensionally stable rigid closed cell polyurethane foam from such a polyol composition having good thermal insulation properties (page 2, paragraph [0005]). This technical problem is solved by controlling the amount of cyclopentane added to the polyol composition so that it is limited to amounts that are soluble therein.

In the Board's judgement, a skilled person starting from the emulsified polyol composition of D1 would not arrive at the claimed storage stable composition in an obvious manner.

The skilled person seeking to transform the known emulsion into a storage-stable solution does not find in D1 any hint that such a solution could be obtained by controlling the amount of cyclopentane. Firstly, D1

specifically concerns emulsified polyol compositions having no particular relevance to storage stability. Secondly, all the tests of table 5 were carried out using a fixed amount of cyclopentane, thus excluding any suggestion of a possible variation of its amount. Thirdly, the solubility/insolubility of cyclopentane is taught to be regulated by modifying only the ratio of aromatic/aliphatic amine based polyether polyol (figure 1; page 302, left-hand column, lines 3-17; page 302, right-hand column, lines 16-18), exploiting its better solubility in the aliphatic amine based polyol. The Board concludes that D1 points rather to a different solution of the problem, which is to increase the amount of the aliphatic amine initiated polyoxyalkylene polyether polyol in the polyol composition.

The argument of the Appellant, that the reduction of the amount of the cyclopentane was obvious to the person skilled in the art, is considered to be based on hindsight in the absence of any indication in that direction in the relevant state of the art.

5.3 Conclusion

Since the teaching of the closest state of the art D1 does not render obvious the method of Claim 1 and the composition of Claim 24, and since the further Claims 2 to 23 of the auxiliary request are dependent on Claim 1, the entire subject-matter claimed by this request involves an inventive step over the cited prior art.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of Claims 1 to 24 of the auxiliary request filed with letter of 24 November 2006 after any necessary consequential amendments of the description.

The Registrar:

The Chairman:

G. Röhn

P. Kitzmantel