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Datasheet for the decision of 6 July 2009

Case Number: T 0490/07 - 3.3.03

Application Number: 99934292.6

Publication Number: 1058701

IPC: C08G 18/42

Language of the proceedings: EN

Title of invention:
Low viscosity polyester polyols and methods for preparing same

Patentee:
STEPAN COMPANY

Opponent:
INVISTA Resins & Fibers GmbH & Co.KG

Headword:
-

Relevant legal provisions:
EPC Art. 56, 123(2)
RPBA Art. 12(2)

Keyword:
"Main request, first and second auxiliary requests- amendments- added subject-matter - (yes)"
"Third auxiliary request- maintenance in amended form - (yes)"
"Reversal of the burden of proof - (no)"
"Ground not substantiated in statement of grounds of appeal"

Decisions cited:
T 0035/85, T 0667/94, T 0615/95, T 0823/96, T 0561/05

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0490/07 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 6 July 2009

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office dated 13 December 2006 and posted 17 January 2007 concerning maintenance of the European Patent No. 1058701 in amended form.**

Composition of the Board:

Chairman: R. Young
Members: M. C. Gordon
C. Vallet

Summary of Facts and Submissions

I. Mention of the grant of European Patent No. 1 058 701 with the title "Low Viscosity Polyester Polyols and Methods for Preparing Same" in the name of Stepan Company in respect of European patent application No. 99934292.6, filed on 23 February 1999 as international application No. PCT/US99/03823, published as WO-A1-99/42508 on 26 August 1999, and claiming a priority date of 23 February 1998 from US 60/075,657 was announced on 02 January 2004 (Bulletin 2004/01) on the basis of 10 claims.

Claim 1 read as follows:

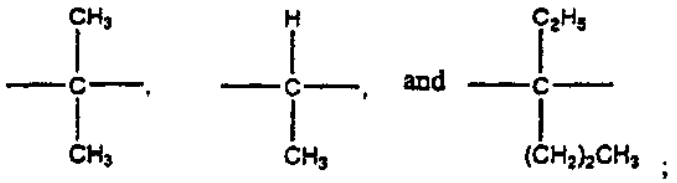
1. A low viscosity aromatic polyester polyol comprising the inter-esterification product of

(a) from 20 to 80 mole percent of at least one phthalic acid based material selected from phthalic anhydride, phthalic acid, isophthalic acid, terephthalic acid, methyl esters of phthalic, isophthalic, or terephthalic acid, dimethyl terephthalate, polyethylene terephthalate, trimellitic anhydride, pyromellitic dianhydride, maleic anhydride, or mixtures thereof;
(b) from 20 to 80 mole percent of a diol component consisting of diethylene glycol und, optionally, at least one other low molecular weight aliphatic diol of the formula

$$HO\text{-}R_1\text{-}OH$$

wherein R_1 is a divalent radical selected from

(i) alkylene radicals each containing from 2 through 12 carbon atoms;
(ii) radicals of the formula $-[CH_2\text{-}R_2\text{-}CH_2]-$ wherein R_2 is a radical selected from



(iii) radicals of the formula

$$-[(R_3O)_n\text{-}R_3]-$$

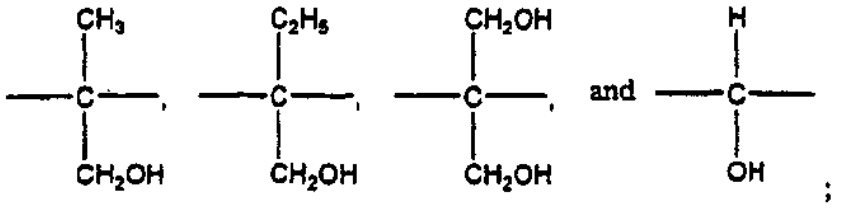
wherein R_3 is an alkylene radical containing from 2-4 carbon atoms and n is an integer from 1 through 10;

or mixtures thereof;
(c) from 0.1 to 20 mole percent of a higher functional polyol of the formula

$$HO\text{-}R_4\text{-}OH$$

wherein R_4 is a divalent radical selected from the group consisting of

(i) radicals of the formula $-[CH_2-R_5-CH_2]-$ wherein R_5 is a radical selected from



;

(ii) radicals selected from alkoxylated glycerine, sucrose, alkoxylated sucrose, methyl glucoside, alkoxylated methyl glucoside, glucose, alkoxylated glucose, fructose, alkoxylated fructose, sorbitol, alkoxylated sorbitol, lactose, and alkoxylated lactose; or mixtures thereof; and

(d) from 0.1 to 20 mole percent of at least one hydrophobic material **characterized by**

(i) having an equivalent weight of 130 - 1000;
(ii) containing from 8 to 60 carbon atoms; and
(iii) containing at least one and not more than four radicals per molecule, which are selected from carboxylic acid ester, carboxyl, hydroxyl, and mixtures thereof;

wherein the aromatic polyester polyol has an average functionality of about two.

Claims 2-7 were dependent claims.

Claim 8 was an independent claim and read as follows:

8. A process for producing a low viscosity aromatic polyester polyol having an average functionality of about two, comprising inter-esterifying in any order

(a) from 20 to 80 mole percent of at least one phthalic acid based material selected from phthalic anhydride, phthalic acid, isophthalic acid, terephthalic acid, methyl esters of phthalic, isophthalic, or terephthalic acid,

dimethyl terephthalate, polyethylene terephthalate, trimellitic anhydride, pyromellitic dianhydride, maleic anhydride, or mixtures thereof;
(b) from 20 to 80 mole percent of a diol componant consisting of diethylene glycol and, optionally, at least one other low molecular weight aliphatic diol of the formula

$$HO\text{-}R_1\text{-}OH$$

wherein R_1 is as defined in claim 1;
(c) from 0.1 to 20 mole percent of a higher functional polyol of the formula

$$HO\text{-}R_4\text{-}OH$$

wherein R_4 is as defined in claim 1; and
(d) from 0.1 to 20 mole percent of at least one hydrophobic material **characterized by**

(i) having an equivalent weight of 130-1000;
(ii) containing from 8 to 60 carbon atoms; and
(iii) containing at least one and not more than four radicals per molecule, which are selected from carboxylic acid ester, carboxyl, hydroxyl, and mixtures thereof.

Claim 9 was dependent on claim 8.

Claim 10 read as follows:

10. A process according to claim 1,
wherein components (a), (b), and (c) are interesterified to form an intermediate polyester polyol, which is further esterified with
(d) from 0.1 to 20 mole percent of the at least one hydrophobic material.

II. A notice of opposition to the patent was filed on 30 September 2004 by Invista Resins & Fibres GmbH & Co. KG.

The grounds of opposition pursuant to Art. 100(a) EPC (lack of novelty, lack of inventive step), Art. 100(b) EPC (insufficiency of disclosure) and Art. 100(c) EPC (extension of the subject-matter of the patent beyond the content of the application as filed) were invoked.
8 documents were cited in support of the opposition, *inter alia*:
D1: US-A-4 644 027
D2: US-A-4 608 432

D4: US-A-4 720 571.
During the course of the opposition proceedings the patent proprietor submitted an Experimental Report (with letter dated 4 December 2006).

III. By an interlocutory decision announced at the end of oral proceedings held on 13 December 2006 and issued in writing on 17 January 2007 the opposition division held that the claims according to the main request (patent as granted), first auxiliary request (filed with a letter dated 15 March 2005) and the second and third auxiliary requests (filed with a letter dated 13 October 2006), the respective claims 1 of which defined feature (b) - the diol component - in identical terms did not meet the requirements of Art. 123(2) EPC due to the definition of said component (b). Claim 1 of the fourth auxiliary request filed with said letter of 13 October 2006 in which feature (b), i.e. the definition of the diol component had been amended compared to claim 1 of the patent as granted by deletion of the phrase "at least one" was held to meet the requirements of Art. 123(2) EPC. The subject-matter of this claim was however held to lack novelty in view of the disclosure of example 27 of D1 (Art. 54 EPC). The opposition division held that the patent could be maintained in amended form on the basis of the fifth auxiliary request, *viz*. a set of 10 claims, filed with a letter dated 13 October 2006.
Claim 1 of this set of claims differed from claim 1 of the patent as granted in that:

- Feature (b) had been amended as reported above for the fourth auxiliary request, i.e. by deletion of the wording "at least one" after

"optionally" in the first phrase thereof.
Accordingly the first phrase of feature (b) of claim 1 of the fifth auxiliary request read as follows:
"(b) from 20 to 80 mole percent of a diol component consisting of diethylene glycol and, optionally, other low molecular weight diols of the formula…";

– Feature (c) of claim 1 of the fifth auxiliary request had been restricted to the compounds specified in part (ii) of feature (c) of claim 1 as granted.
Accordingly feature (c) of claim 1 of the fifth auxiliary request read as follows:
"(c) from 0.1 to 20 mole percent of a higher functional polyol of the formula

$$HO\text{-}R_4\text{-}OH$$

wherein R_4 is a divalent radical selected from the group consisting of
radicals selected from alkoxylated glycerine, sucrose, alkoxylated sucrose, methyl glucoside, alkoxylated methyl glucoside, glucose, alkoxylated glucose, fructose, alkoxylated fructose, sorbitol, alkoxylated sorbitol, lactose, and alkoxylated lactose;
or mixtures thereof; and".

The definition of the diol in feature (b) of claim 8 had been amended analogously to feature (b) of claim 1, i.e. by deletion of the wording "at least one".

(a) *Art 100(b)/83 EPC*

The decision held that the requirements of Art. 83 EPC were satisfied.

(b) *Art 100(c)/123(2)EPC*

The decision held that the feature "diethylene glycol and, optionally other..diols" was acceptable pursuant to Art. 123(2) EPC *inter alia* in view of passages relating to a clear preference for diethylene glycol and to a list of diol examples including diethylene glycol and combinations thereof.

With respect to feature (c) of claim 1 it was further held that the deletion of one of two variants (i.e. deletion of variant (i)) for component (c) of claim 1 did not give rise to any problem with respect to Art. 123(2) EPC.

Accordingly claim 1 of the fifth auxiliary request was held to be allowable under Art. 123(2) EPC.

(c) *Art. 54 EPC*

The decision recorded that the opponent admitted novelty of the subject-matter of claim 1 of the fifth auxiliary request over example 27 of D1 since the trimethylol propane ("TMP") polyol employed in that example was no longer claimed.

A further objection of lack of novelty in respect of the disclosure of D1 based on the "whole contents approach" was not found convincing.

(d) *Art 56 EPC*

The decision held that the problem addressed by the patent in suit was to provide aromatic polyester polyols suitable for the production of "CASE" materials (coatings, adhesives, sealants,

elastomers) which normally were flexible materials. According to the decision it was undisputed by the parties that the closest prior art was represented by D1. It was however also undisputed that D1 addressed only the problem of making cellular products and not to the manufacture of CASE materials.

Accordingly D1 was regarded *a priori* as an inappropriate document to make clear suggestions for combination of components suitable for the manufacture of CASE materials.

Example 27 of D1 was regarded as the closest starting point from which the subject-matter of operative claim 1 was distinguished by the use of alkoxylated sucrose instead of TMP.

It was true that alkoxylated sucrose as such was also mentioned in D1 (Example E). However since D1 did not address the specific problem of making CASE materials, no suggestion could be extracted from D1 to select such alkoxylated sucrose in making polyester polyols suitable for such application.

For this reason alone the subject-matter of claim 1 of the fifth auxiliary request had to be regarded as implying an inventive step.

Moreover the function of this alkoxylated sucrose in the context of the teaching of D1 was unclear. Specifically it was not clear from D1 whether this alkoxylated sucrose was regarded as a nonreacting, post-added component or as a further optional reactant. The decision further held that without any doubt there was no teaching in D1 suggesting that the alkoxylated sucrose of Example E was an alternative for TMP in example 27 of D1 in making

cellular products (the problem of D1) let alone in making CASE materials (the problem of the patent of the patent in suit).

IV. A notice of appeal against the decision was filed by the opponent on 21 March 2007, the prescribed fee being paid on the same day.

V. The statement of grounds of appeal was filed on 24 May 2007.

(a) It was requested to transfer the appellant's written submissions from the opposition proceedings to the appeal proceedings as well as the prior art documents cited in the opposition proceedings. All 8 of these documents were listed.

(b) The objection pursuant to Art. 83/100(b) EPC was maintained.

(c) With respect to Art 100(c)/123(2) EPC it was submitted that operative claim 1 (i.e. claim 1 of the fifth auxiliary request considered by the opposition division) covered according to feature (b) thereof two possible scenarios regarding the diol component:

- 20-80 mole-% of diethylene glycol
- 20-80 mole-% of a combination of diethylene glycol and other diols.

In the application as filed component (b) had been defined as "from about 20 to 80 mole percent of at least one low molecular weight aliphatic diol of the formula […]". Thus according to the application as filed, component (b) had to be

selected from one or more of a group of compounds defined by a certain formula which - amongst many others - included diethylene glycol.
This claim as filed did not say that any specific one of the diols had to be selected let alone that diethylene glycol had to be selected, which is what the two scenarios of operative claim 1 required. It was conceded that references in the application as filed to a combination of diethylene glycol and neopentyl glycol might support the first of these scenarios in as much as those parts of the description referred to diethylene glycol as the - only - selected diol. However none of these parts of the specification supported the second scenario of the claim which accordingly violated the requirements of Art. 123(2) EPC.

(d) Objections pursuant to Art. 54 EPC were not raised in the statement of grounds of appeal.

(e) With respect to Art. 56 EPC the distinction made by the opposition division between CASE materials and cellular foams was disputed; on the contrary the term "CASE materials" was generic and encompassed cellular foams as was apparent from paragraph [0008] of the patent in suit. The consequence of this was that no additional or separate problem existed which could have been solved by the patent in suit.
Further the patent did not support that a separate problem had been solved with the specific higher functional polyols; there was no evidence that said polyols were better for anything, it being

noted that the examples of the patent in suit did not show any CASE material made from the polyester polyols.

Regarding the burden of proof, it was considered that in the present situation where it had been shown that the subject-matter of the main request and four auxiliary requests did not comply with the EPC and the patent proprietor had submitted a further request (i.e. the fifth auxiliary request) it was the burden of the patent proprietor to prove that this request met the requirements of the EPC, which requirement included showing a technical effect associated with the amendment made. If this could not be shown then the amendment would be arbitrary, made only to avoid an objection of lack of novelty, and could not be relied upon for the purpose of inventive step.

The comparative examples submitted by the patent proprietor with the letter of 4 December 2006 did not show the required technical effect since these did not demonstrate the effect of the specific selection of higher functional polyols.

Accordingly the specific selection of higher functional polyols had to be regarded as an arbitrary selection.

In the alternative, if the problem with regard to D1 was seen in providing alternative polyester polyols the choice of the specific higher functional polyols of the operative claims was obvious with respect to D1 since this suggested alkoxylated glycerine and alkoxylated sucrose in Examples D and E, both of which were members of the list of components (c) according to operative claim 1.

VI. The patent proprietor - now the respondent replied with a letter dated 25 September 2007.
Dismissal of the appeal was requested. Further five amended sets of claims forming a first, second, third fourth and fifth auxiliary request were submitted.
In the first auxiliary request, consisting of 10 claims, claims 1 and 8 had been amended compared to the main request - i.e. the claims as upheld by the opposition division - by deletion of the term "about" from the wording "average functionality of about 2" in the final line of the claim.
In the second auxiliary request - consisting of 9 claims - claims 1 and 8 had been restricted by the subject-matter of granted claim 10, i.e. the order of reaction of the components was specified (see section I, above). The term "about" had however been retained in claims 1 and 8 with respect to the definition of the functionality.

The third, fourth and fifth auxiliary requests, differed from respectively the main request and the first and second auxiliary requests in that the term "and, optionally other low molecular weight…" in the definition for component b) had been deleted.
Accordingly claim 1 of the third auxiliary request read as follows:

1. A low viscosity aromatic polyester polyol comprising the inter-esterification product of

(a) from 20 to 80 mole percent of at least one phthalic acid-based material selected from phthalic anhydride, phthalic acid, isophthalic acid, terephthalic acid, methyl esters of phthalic, isophthalic, or terephthalic acid, dimethyl terephthalate, polyethylene terephthalate, trimellitic anhydride, pyromellitic dianhydride, maleic anhydride, or mixtures thereof;

(b) from 20 to 80 mole percent of a diol component consisting of diethylene glycol;

(c) from 0.1 to 20 mole percent of a higher functional polyol of the formula

$$HO\text{-}R_4\text{-}OH$$

wherein R_4 is a divalent radical selected from the group consisting of

radicals selected from alkoxylated glycerine, sucrose, alkoxylated sucrose, methyl glucoside, alkoxylated methyl glucoside, glucose, alkoxylated glucose, fructose, alkoxylated fructose, sorbitol, alkoxylated sorbitol, lactose, and alkoxylated lactose;

or mixtures thereof; and

(d) from 0.1 to 20 mole percent of at least one hydrophobic material

characterized by

(i) having an equivalent weight of 130 to 1000;

(ii) containing from 8 to 60 carbon atoms; and

(iii) containing at least one and not more than four radicals per molecule, which are selected from carboxylic acid ester, carboxyl, hydroxyl, and mixtures thereof;

wherein the aromatic polyester polyol has an average functionality of about two.

Claims 2-10 corresponded to claim 2-10 of the main request, i.e. the claims as upheld by the opposition division. Accordingly the definition of the diol in claim 8 of the third auxiliary request had not been

amended in accordance with the definition in claim 1 thereof.

(a) It was submitted that the patent in suit met the requirements of Art. 83 EPC.

(b) With regard to Art. 123(2) EPC it was submitted that the requirement of whether an amendment in a claim was allowable pursuant to Art. 123(2) EPC was not literal anticipation of any amendment in the originally filed documents but that the amendment had to be directly and unambiguously derivable for the skilled person from the contents of the application as a whole.
It would be perfectly clear for the skilled person that according to the present invention, and in particular in view of a number of - identified - text passages in the description that one or more diol components could be used and that diethylene glycol was especially preferred. Hence it was not necessary to make any selection in order to arrive at the subject-matter of a claim referring to diethylene glycol and optionally further diols.

(c) It was noted that the appellant/opponent had not presented any arguments in respect of novelty.

(d) With regard to inventive step it was disputed that the burden of proof had shifted towards the patent proprietor due to a claim amendment. Further it was noted that the only experimental evidence so far had been submitted by the patent proprietor, and hence it was not up to the patent proprietor to provide further proof.

With regard to the arguments of the appellant/opponent that the specific selection of higher function polyols had to be seen as an arbitrary selection at best establishing novelty, the respondent/patent proprietor indicated that it concurred with the view of the appellant/opponent that claim 1 of the opposed patent referred to a low viscosity aromatic polyester polyol comprising the inter-esterification product of a specific mixture of components and that neither this selection of components nor a product thereof was disclosed in D1. The specific selection of the components in the indicated amounts together with the average functionality of two of the aromatic polyester polyols allowed for the provision of low viscosity inter-esterification products and for the provision of aromatic polyester polyols which could be used to prepare cellular foams and other CASE materials having superior properties. It was this selection of the specific components together with the specific average functionality required by the claim which allowed for the provision of the advantages on which the respondent/patent proprietor relied, reference being made to the experimental report of 4 December 2006 which showed that CASE materials having an average functionality of two provided better properties than CASE materials made from the same components but with another functionality. Since D1 did not even disclose such combination of components the respondent/patent proprietor could not see how a skilled person should arrive at the claimed subject-matter.

VII. On 24 April 2009 the Board issued a summons to attend oral proceedings.
The Board issued a communication on 29 April 2009.

(a) The Board expressed its preliminary, provisional opinion that claim 1 of the main request and of the first and second auxiliary requests did not meet the requirements of Art. 123(2) EPC. In particular a distinction was drawn between subject-matter that was implicitly disclosed in the application and that which was rendered obvious by the content of a document, reference being made to decision T 823/96 of 28 January 1997 (not published in the OJ EPO).
The amendment made to the respective claim 1 of the third, fourth and fifth auxiliary requests was considered to address this defect. It was however noted that a corresponding amendment had not been made to claim 8 of said requests (cf section VI above).

(b) The objection raised pursuant to Art. 83 EPC was not considered to be well founded.

(c) The Board drew attention to a number of unexplained amendments in the submitted requests, giving rise to objections pursuant to R. 80 EPC.

VIII. Together with a letter dated 5 June 2009 the respondent/patent proprietor submitted amended sets of claims according to the main request and to the first to fifth auxiliary requests. Claim 8 of the third and fourth auxiliary requests had been amended to render these consistent with the corresponding claim 1 of said

claim sets (cf sections VI and VII.(a) above).
It was submitted that amendments had also been made in order to address the objections raised pursuant to R. 80 EPC by the Board.
It was reiterated that the subject-matter of the main request and of the first and second auxiliary requests did not contravene the requirements of Art. 123(2) EPC. In this connection the relevance of the decision cited by the Board in its communication was disputed (see section VII.(a) above).

IX. Oral proceedings were held before the Board on 6 July 2009.

(a) *Art 123(2) EPC*

The appellant/opponent submitted that there was no disclosure in the generic part of the application as filed that the glycol component was to consist of diethylene glycol and any other diol. In particular there was no disclosure in the application as filed that any combination of glycols had mandatorily to encompass diethylene glycol.

The respondent/patent proprietor submitted that the specification of diethylene glycol in claim 1 of the main request did not amount to a selection. This glycol was consistently disclosed in the application as filed as being suitable, and moreover as being especially preferred. It was submitted that in the case where one embodiment was continuously emphasised as being preferred the selection of this would not constitute addition of subject-matter since such a selection resulted in abandonment of other, less preferred embodiments.

It was reiterated that the case law cited by the Board, i.e. T 823/96 was not applicable in this situation.
After deliberation the Board announced that the subject-matter of the main request did not meet the requirements of Art. 123(2) EPC. This conclusion applied also to the first and second auxiliary requests which employed the same specification of the diol, which finding was not challenged by the respondent/patent proprietor.

The opponent/appellant raised no objections to the claims of the third auxiliary request pursuant to Art. 123(2) EPC.
The Board drew attention to a number of outstanding objections pursuant to R. 80 EPC, which the respondent/patent proprietor indicated it was prepared to address by making appropriate amendments. The appellant/opponent indicated that it would not object to permitting the respondent/patent proprietor to make such amendments.
Following a break, the respondent/patent proprietor submitted an amended set of claims as the third auxiliary request in which, compared to the version as submitted with the letter of 5 June 2009, editorial amendments had been made to claims 3, 7 and 10.
The appellant stated it had no formal objections to the amendments to the new third auxiliary request.
After deliberation the Board announced that the newly filed third auxiliary request met the requirements of Art. 123(2) and R. 80 EPC.

(b) *Art. 83 EPC*

The appellant/opponent stated that it did not maintain the objection pursuant to Art. 83 EPC.

(c) *Art 54 EPC*

The appellant/opponent confirmed that an objection pursuant to Art. 54 EPC was not raised.

(d) *Art 56 EPC*

The appellant emphasised that the objection related to the definition of component (c) of claim 1, i.e. the higher functional polyol.
It was recalled that claim 1 as granted had been anticipated by the disclosure of example 27 of D1, which objection had been addressed by restricting the definition of the aforementioned component (c).
The question of inventive step therefore reduced to the effect of the restriction of the definition of the polyol. As there was no evidence for an effect associated with this restriction the technical problem could only be formulated as being to provide an alternative polyester polyol to those known in the state of the art.
The evidence submitted by the patent proprietor with the letter of 4 December 2006 did not provide appropriate evidence as this related to a different parameter, namely the functionality of the polyester polyol.
The respondent/patent proprietor reiterated that the burden was on the appellant/opponent to provide evidence in support of the argument that there was no technical effect. The evidence submitted by the respondent/patent proprietor did

relate to subject-matter covered by the operative claims and demonstrated a technical effect associated with the functionality of the polyester polyol. The operative claims required the presence of four defined components. D1 however did not disclose a reaction product of the four components specified in operative claim 1. Further it was disputed that D1 and the patent in suit even addressed the same problem. According to D1 the problem was to improve the compatibility of Freon blowing agents with polyester polyols employed in the production of rigid cellular foam. However in contrast to the patent in suit, D1 was not concerned with flexibility of CASE materials.
It was emphasised that the appellant/opponent, who bore the burden of the proof had provided no evidence in support of its contention that there was no technical effect. It was also emphasised that the only teaching in D1 with respect to the functionality was that this be less than 3. The concept underlying the invention of the patent in suit was that an improvement occurred when the functionality approached 2, as confirmed by the evidence of 4 December 2006.
It was also emphasised that the amendments made to the subject-matter of the claims did not result in a reversal of the burden of the proof, as contended by the appellant/opponent.

The appellant/opponent emphasised that foams were simply a subset of CASE materials. Whether a foam or another type of CASE material was obtained depended only on what other components were added thereto.

With regard to the functionality it was submitted that all the polyester polyols disclosed in D1 had a functionality of about 2 and hence that following the teaching of D1 would inevitably result in a functionality of 2. Further the evidence of the respondent/patent proprietor demonstrated an effect associated with a functionality of precisely 2. The claim however encompassed both of the values of the "comparative" compositions demonstrated i.e. 1.8 and 2.2. Thus the evidence could not support an inventive step associated with the functionality range specified.
The question thus reduced to that of whether the skilled person would consider D1 which did not disclose the polyfunctional alcohols as now claimed. It was further submitted with respect to the burden of the proof that it was not for the appellant/opponent to demonstrate the absence of an effect but for the respondent/patent proprietor to establish that an effect did occur.

The respondent/patent proprietor submitted that the appellant appeared to be basing the attack on inventive step on the subject-matter of the previous claim, not on D1. Further although both the patent in suit and D1 referred to foams this did not mean that the same technical problem was addressed.

The appellant/opponent submitted that even disregarding the history of the case D1 still had to be considered as being the closest prior art, the difference being the selection of specific

components (c).

In the course of this discussion the Board drew the attention of the Parties to decision T 35/85 of 16 December 1986 (not published in the OJ EPO) noting that the comparative examples of 4 December 2006 were closer to the claimed subject-matter than the subject-matter disclosed in D1.

(e) In the course of the discussion of inventive step the appellant/opponent sought to refer to D2 and D4, submitting that the teachings of these documents could be invoked since they had been cited in the statement of grounds of appeal and the submissions made in the opposition proceedings had also been invoked (see section V.(a) above). The respondent/patent proprietor resisted this referring to the Rules of Procedure of the Boards of Appeal and noting that only D1 had been relied upon in the statement of grounds of appeal. After deliberation the Board decided, with reference to the Rules of Procedure of the Boards of Appeal that it was not prepared to hear arguments based on D2 and D4.

(f) It was then announced that the subject-matter of the claims of the (new) third auxiliary request met the requirements of Art. 56 EPC.

X. The appellant (opponent) requested that the decision under appeal be set aside and that the European patent No. 1 058 701 be revoked.

The respondent (patent proprietor) requested that the patent be maintained in amended form on the basis of the main request or the 1st or 2nd auxiliary request filed with the letter dated 5 June 2009 or, the new 3rd auxiliary request (claims 1 to 10) filed at the oral proceedings, or on the basis of the 4th or 5th auxiliary request filed with the letter dated 5 June 2009 in that order.

Reasons for the Decision

1. The appeal is admissible

2. Main request

2.1 *Art 123(2) EPC*

2.1.1 As explained in section III above, claim 1 of the main request (i.e. corresponding to the fifth auxiliary request considered by the opposition division) defines the diol component in the following terms:
"(b) from 20 to 80 mole percent of a diol component consisting of diethylene glycol and, optionally other low molecular weight diols of the formula…".

2.1.2 Independent claim 1 (product) and independent claim 15 (process) of the application as filed (reference being made to the PCT publication) specify the aliphatic diol by means of a generic formula, but do not define any

specific compounds.
Similarly dependent claim 4 specifies that the diol **is** diethylene glycol (emphasis of the Board), but the terms of this claim do not specify the presence of any other diol(s).

2.1.3 In the section of the application entitled "Aliphatic Diols" (commencing at page 11 line 18 and continuing onto page 12) various specific aliphatic diols including diethylene glycol "or any combination thereof" are listed. Thus diethylene glycol is mentioned twice, once at page 12 line 7 as one of the "Examples of suitable aliphatic diols" and once at page 12 line 15 where it is stated that "Preferred aliphatic diols are neopentyl glycol and diethylene glycol".
Further all the examples employ - as the sole diol - diethylene glycol.

2.1.4 Whilst it is true, as argued by the respondent/patent proprietor that diethylene glycol was especially **preferred** (see section VI.(b) and IX.(a) above) - Board's emphasis - and that combinations of aliphatic diols from the list referred to above might be used, there is nothing in the list to suggest that any combination thereof must necessarily include DEG, and there is nothing in the specifically subsequently mentioned association of DEG and neopentyl glycol (which latter compound is not mentioned in the said list) to suggest that such an association could be extended to another group of diols, such as those in the list. Hence there is no disclosure of the specific selection of DEG in combination with the generality of "other low molecular weight diols of the formula …" etc,

in the documents of the application as filed. Accordingly there is no explicit disclosure in either the claims or the description of the application that diethylene glycol optionally in combination with other diols may be employed as the diol component.

2.1.5 This conclusion cannot be altered by the argument of the respondent/patent proprietor that the specification of DEG in claim 1 of the main request did not amount to a selection. It is the further step of combining the DEG with other aliphatic diols and making this explicit which constitutes the selection.

2.1.6 In this connection, the expression of a preference does not render an embodiment mandatory or inevitable - it merely suggests to the skilled reader that this embodiment may exhibit particularly advantageous properties, i.e. make it obvious to employ this embodiment.

2.1.7 Whilst the respondent/patent proprietor suggested that the Board's citation of T 823/96 lacked relevance (see sections VII.(a), VIII and IX.(a), above) since it was not specifically concerned with the allowability of amendments, the point of this decision is that it deals with the question of what might be considered to be disclosed in a document even if not explicitly described therein - i.e. what might be the implicit disclosure of said document. This was **not** to be construed as meaning matter that did not belong to the **content** of the technical information provided by a document but might be rendered **obvious** on the basis of that content (emphasis of the decision cited). Rather in order for subject-matter that was not explicitly

disclosed in a document to be considered nevertheless to belong to the technical information provided by that document, i.e. to be "implicitly disclosed" therein it was required that such matter be a clear and unambiguous consequence of that which was explicitly mentioned. The question of what might be rendered obvious by a disclosure in the light of common general knowledge was not relevant to the assessment of what was implied by the disclosure of said document. These two questions had to be strictly separated.
Thus the disclosure of a number of aliphatic diols on page 12, even if stated explicitly to be preferred, at most renders it **obvious** to employ a particular combination of said diols. The respondent/patent proprietor has however identified no disclosure in the application as filed of which the clear and unambiguous consequence is that one or other of these diols has mandatorily to be present, regardless of which other diols are present. Thus the respondent/proprietor has failed to demonstrate that the application as filed contains an implicit disclosure equivalent to the scope of the subject-matter of feature (b) of operative claim 1.
Accordingly it is concluded that there is no disclosure - implicit or explicit - in the application as filed of the feature "diethylene glycol and optionally other diols". Accordingly this feature extends beyond the content of the application as originally filed, contrary to the requirements of Art. 123(2) EPC.

2.2 For the foregoing reasons, the main request does not meet the requirements of Art. 123(2) EPC.

2.3 The main request is therefore refused.

3. *First and second auxiliary requests*

3.1 *Art. 123(2) EPC*

These requests employ the same definition of the diol component (b) as the main request and consequently suffer form the same defect. This conclusion was not challenged by the respondent/patent proprietor on the occasion of the oral proceedings (see section IX.(a) above).

3.2 The first auxiliary request and second auxiliary request are therefore refused.

4. *Third auxiliary request*

4.1 Art. 123(2) EPC

Compared to the main request, feature (b) of the third auxiliary request is restricted to diethylene glycol as the diol (see section VI above). The appellant/opponent did not raise any objection to this request pursuant to Art. 123(2) EPC (see section IX.(a) above), nor has the Board any objections of its own in this respect. As noted above, diethylene glycol is explicitly disclosed on page 12 of the application as filed as one of the diols. The effect of this amendment is to eliminate alternatives but does not generate any new combination of subject-matter (cf T 615/95, of 16 December 1997, not published in the OJ EPO, Reasons 6).

The claims of the third auxiliary request therefore meet the requirements of Art. 123(2) EPC.

4.2 *Art. 83/100(b) EPC*

The objections raised under this ground of opposition were withdrawn by the appellant/opponent (see section IX.(b) above). The Board has no objections of its own pursuant to this ground.

The third auxiliary request therefore meets the requirements of Art. 83 EPC.

4.3 *Art. 54 EPC*

Objections under this ground of opposition were not raised in the appeal procedure (see sections V.(d) and IX.(c) above), nor has the Board any objections of its own.

The subject-matter of the claims of the third auxiliary request therefore meets the requirements of Art. 52(1) EPC in combination with Art. 54 EPC.

4.4 *Art. 56 EPC*

4.4.1 *The patent in suit, the technical problem*

The patent in suit relates according to paragraph [0001] and claim 1 to low viscosity aromatic polyester polyols having an average functionality of about two formed by inter-esterification of a phthalic acid based material with diethylene glycol, a higher functional polyol and a hydrophobic material.

It is explained that aromatic polyols are widely used in the manufacture of polyurethane and polyurethane-polyisocyanurate foams and resins. Aromatic polyester polyols are attractive since they tend to be low in cost yet can be used to produce a wide variety of cellular foams having excellent properties and adaptable for many end use applications. One class of commercially successful polyester polyols is produced

by esterification of phthalic acid or phthalic acid anhydride with an aliphatic polyhydric alcohol. Such a polyester polyol is somewhat viscous and is capable of reacting with organic isocyanates to produce Coatings, Adhesives, Sealants and Elastomers ("CASE" products), that can have excellent characteristics such as tensile strength, adhesion and abrasion resistance (patent in suit, paragraphs [0002] and [0003]).

One problem with aromatic polyester polyols is that they have high dynamic viscosity, making handling very difficult. They often have to be diluted or dissolved in a solvent for use (paragraph [0004]).

Ideally an aromatic polyester polyol would have a dynamic viscosity that is sufficiently low to allow ease of pumping and mixing without the use of solvents or other viscosity modifiers (patent in suit paragraph [0005]).

Accordingly there is a need for low viscosity aromatic polyester polyols having an average functionality of about two, that are economical to produce and can be converted into cellular foams and other CASE materials having excellent properties (patent in suit paragraph [0008]).

According to the summary of the invention in paragraph [0009] of the patent in suit the invention further relates to cellular foams made from the polyester polyols. It is taught that the polyester polyols may be utilised with a wide variety of blowing agents *inter alia* chlorofluorocarbons.

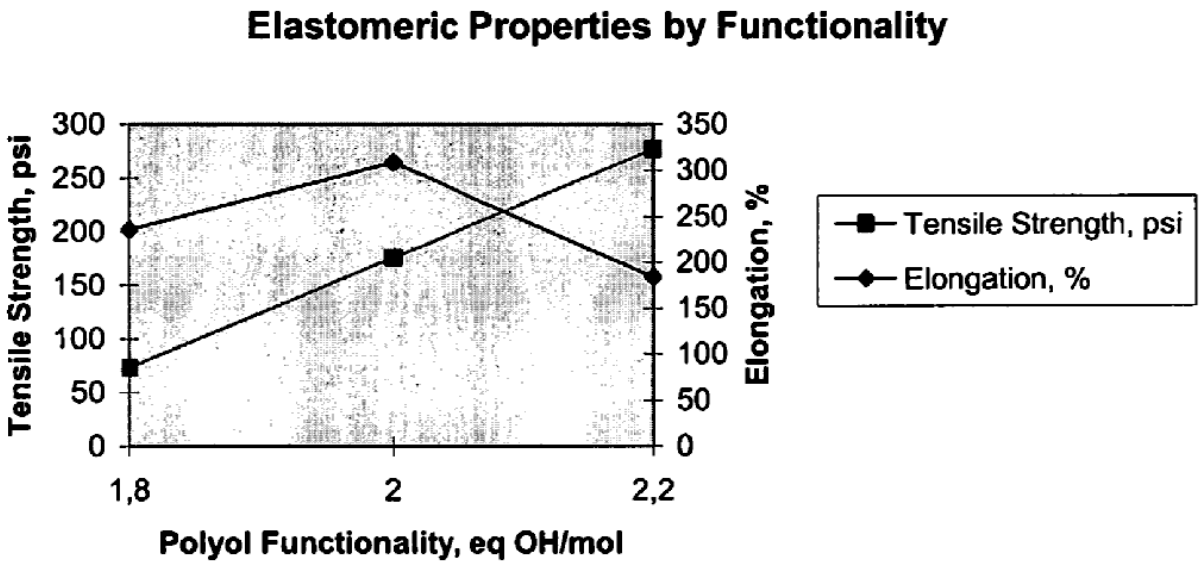
The examples of the patent in suit relate to polyester polyols having dynamic viscosities ranging from 3700 cps @ 25°C (example 1) to 8400 cps @ RT (example 3).

None of the examples in the patent in suit demonstrates the reaction product of said polyols with an organic

isocyanate.

Such evidence was however provided with the letter of the respondent/patent proprietor dated 4 December 2006 (see section II above).

This evidence related to three polyester polyols. "Polyol A" was prepared according to example 2 of the patent in suit and had an average functionality of 2.0. "Polyol B", having an average functionality of 1.8, was prepared by modifying "Polyol A" by reaction with soybean oil to yield a polyester polyol. "Polyol C", with an average functionality of 2.2 was prepared by modifying "Polyol A" with "Voranol" (propoxylated glycerine cf paragraph [0044] of the patent in suit). Elastomers were prepared from these three polyols by reaction with diphenylmethane diisocyanate (MDI). The results, presented in the form of a graph showed that an optimum balance between tensile strength and elongation was obtained at a functionality of 2:



In the light of this evidence it can be concluded that the problem as set out in paragraph [0008] of the patent in suit has been effectively solved by the claimed measures.

4.4.2 *The prior art*

Only D1 was invoked in the statement of grounds of appeal (see section V.(e) above).

D1 is directed according to claim 1 to a process for preparing a high aromatic content low acid number self compatibilised phthalate polyester polyol blend. This blend is prepared according to the claim by producing a liquid reaction product of:

- (A): at least one phthalic acid material with
- (B): at least one aliphatic diol and
- (C): at least one hydrophobic material.

The liquid reaction product is admixed with:

- (D): at least one nonionic propoxylate ethoxylate compound.

According to the section entitled "Background of the Invention" the aim of D1 is to produce polyols useful in formulating prepolymer blends for reaction with organic isocyanates to produce polyurethane and/or polyurethane-polyisocyanurate cellular polymers and in particular in the field of phthalate polyester polyols which self-compatibilize with fluorocarbon blowing agents.

It is explained in the section entitled "2. Prior Art" that aromatic polyester polyols are attractive in particular in order to produce rigid cellular polymers (D1, col. 1 lines 15-20). A known commercial product has low viscosity, a high aromatic content and low acid number. Even though such product typically has a reactive hydrogen functionality of less than about 3 it catalytically reacts well with organic isocyanates to produce rigid cellular polymers having excellent properties such as compressive strength, tumble

friability and burn char (D1 col. 1 lines 25-35).
One problem with aromatic polyester polyols is that these are poorly compatible with fluorocarbon compounds of the type conventionally used as blowing agents to make cellular polymers (D1, col. 1 lines 36-40).
Although this problem had been addressed by including a compatibilizing agent (D1, col. 1 lines 41-44) it is explained that this is however undesirable in terms of cost incurred through the additional process step required and due to the cost of the additive itself (col. 1 line 56 to col. 2 line 5). Accordingly the aim of D1 was to provide phthalate polyester polyols which were self compatibilizing with fluorocarbon blowing agents and had a combination of low viscosity, low reactive hydroxyl functionality (i.e. less than 3) and high aromatic ring content (col. 3 lines 29-37).
The polyester polyols of D1 are the reaction products of the three components (A), (B) and (C) specified in claim 1 thereof. A propoxylate ethoxylate compound (D) can be dissolved in the phthalate polyester polyol blend, without causing gelation upon addition of fluorocarbon and without the need for also adding a further agent. The mixture is stated to display excellent fluorocarbon compatibility characteristics (col. 4 line 56 to col. 5 line 12). These hydrophobic compound modified phthalate polyester polyol blends form when catalytically reacted with organic isocyanates cellular foams of superior tumble friability and also superior uniform small sized cell structure (col. 5 lines 13-20).
With respect to the hydrophobic compound it is taught that after formation of the polyester polyol a blend thereof can be prepared with a nonionic surfactant of the propoxylate ethoxylate type (col. 7 line 44-col. 8

line 21). Such compounds are exemplified in examples D and E of D1, namely alkoxylated glycerine and alkoxylated sucrose. Hence, as noted in the decision under appeal (see section III.(d) above) and submitted by the appellant/opponent (see section V.(e) above) these compounds correspond to those specified according to feature (c) of operative claim 1.
According to the passage commencing at column 8 line 22 of D1 optionally the starting mixture (i.e. prior to reaction) can, in addition to reaction components (A), (B) and (C), contain minor amounts of other reactive components such as polyhydroxylated and polycarboxylated compounds, i.e. compounds having three or more functional hydroxyl and/or carboxyl groups. Such compounds, include *inter alia* 1,1,1-trimethylolpropane - TMP - which is employed in example 27 of D1 (see section III.(c), above).

4.4.3 *The relationship between the patent in suit and D1*
Whilst the general teaching of D1 relates, as explained above, to a reaction product of three components (A), (B) and (C) to which a fourth component (D) - corresponding to component (c) of operative claim 1 - may be added after completion of the reaction, example 27 of D1 (the final example) differs in that a fourth component - trimethylol propane as mentioned above - is present prior to the reaction forming the product. This is stated in example 27 of D1 to illustrate that triols in controlled amounts can be incorporated in a starting mixture with phthalic anhydride, diol and hydrophobic compound without producing gelation and also that the product has improved Freon solubility compared with the same product without any hydrophobic compound. Thus, whilst the subject-matter of operative claim 1 differs

from that of example 27 of D1, which has been held in the decision under appeal to disclose an aliphatic polyol having a functionality of "about 2" since it was held to be novelty destroying for the subject-matter of claim 1 of the fourth auxiliary request considered by the opposition division (see section III, above), by the definition of component (c), the subject matter of operative claim 1 also differs from the general teaching of D1 in that the polyester polyols are formed by the polymerisation mandatorily of the four components recited. Although all four such components are also disclosed in D1, that corresponding to component (c) of the operative claims, i.e. the higher functional polyol (component (D) - see examples D and E of D1) is not employed as a co-reactant but is blended with the reaction product of the other 3, as explained in section 4.4.2 above.

4.4.4 *The objective technical problem*

(a) The evidence provided by the comparative data filed with the letter of 4 December 2006 does not correspond to the teaching of D1 since it relates to polyester polyols which are the copolymerisation product of the four components specified in operative claim 1 and specifically demonstrates polyester polyols having a functionality of around two, i.e. 1.8, 2.0 and 2.2. This comparison however lies closer to the claimed subject-matter than the disclosure of D1. This comparison demonstrates that by maintaining a functionality of about 2 it is possible to optimise the properties of the isocyanate/polyester polyol reaction product.

(b) According to Art. 56 EPC, as applied in T 35/85 of 16 December 1986 (not published in the OJ EPO) an applicant or patent proprietor can discharge the onus of proof by voluntarily submitting comparative tests with newly prepared variants of the closest state of the art making identical the features common with the invention in order to have a variant lying closer to the invention so that the advantageous effect attributable to the distinguishing features of the invention is thereby more clearly demonstrated (T 35/85 Reasons 4).

(c) The comparative examples submitted with the letter of 4 December 2006 correspond to the construction considered in T 35/85 to the extent that CASE materials produced using a polyol according to the invention of the patent in suit (Polyol A - average functionality 2.0) are shown to have improved properties compared to those having a functionality below 2.0, i.e. 1.8 (Polyol B) or above 2.0, i.e. 2.2 (Polyol C). This proves in the Board's view that in the context of the aliphatic polyols claimed, i.e. derived from the specified four components a functionality adjusted to "about" 2 results in a relevant beneficial effect in the resulting CASE material.

4.4.5 The argument of the appellant/opponent that there was no evidence for an effect associated with the restriction of the definition of component (c) which had been effected to provide a distinction over example 27 of D1 (which represented the closest state

of the art with which the respondent/patent proprietor would have been obliged to provide a comparison, thus effectively transferring to him the burden of proof) has to be seen in the light of the experimental data referred to in section 4.4.4(c) above), and in view of the considerations which follow:

(a) It is the burden of the party challenging the decision of the first instance - here the appellant/opponent - to prove its case (T 667/94 of 16 October 1997, not published in the OJ EPO, reasons, 3).
This would indicate, in the present case that the burden of proof, which in opposition proceedings initially always lies with the opposing party or parties, remains with the appellant/opponent.

(b) It is true in the special circumstances of the present case where the feature restricted compared with D1 (the definition of Component (c)) is not the same as the feature varied in the comparative tests supplied by the respondent/patent proprietor with the letter of 4 December 2006 (the functionality of the resulting polyol) that the Board might have concluded that the failure of either party to provide a comparison with the closest state of the art, Example 27 of D1, left a "residual burden" of proof on the respondent/patent proprietor to fill this gap with further evidence of its own.
In this connection, however, it has to be borne in mind that the subject-matter of operative claim 1, both before and after amendment, has been restricted to a polyol composition which is the

reaction product of the four components (a), (b), (c) and (d), whereas the general teaching of D1 is that the component (D), corresponding to component (c) of operative claim 1 should not be added as a reactant but only as an additive to the formed product (of (A), (B) and (C)), the functionality of the product of (A), (B) and (C) furthermore not being required to be other than "less than 3" (see section 4.4.2, above).
Thus, the distinction of the subject matter of operative claim 1 over example 27 of D1 has to be seen as the replacement, as a reactant, of trimethylol propane by a substance corresponding to post-reaction additive (D) of D1, now as a reactant, with simultaneous maintenance of the overall functionality of the product at "about 2" (see section 4.4.3, above).
Consequently the amendment restricting the choice of the reactant component (c) merely emphasised a constellation of subject matter, different from the disclosure of D1, which was present all along.

(c) In the present case, furthermore, the respondent/patent proprietor has already provided evidence of its own with the submission of the experimental report of 4 December 2006 (see section 4.4.4(c) above), which illustrates in a comparison lying closer to the claimed subject-matter than the closest state of the art (Example 27 of D1) and emphasising the distinction with respect to said closest state of the art, that a polyol composition having been prepared by reaction of the four components specified in claim 1 is able to produce a CASE material the

combination of relevant properties of which is optimised as the functionality approaches 2, whether from above or below. This already refutes the main contention of the appellant/opponent that the combination claimed is based on an arbitrary selection. Furthermore, since the nature of the comparative data supplied by the respondent/patent proprietor on 4 December 2006 is closer than a comparison with D1 would have been in view of the principles established in T 35/85 (see section 4.4.4(b) above), the Board is obliged, even in the case that the burden of proof would have transferred from the appellant/opponent to the respondent/patent proprietor, to regard this data, in the absence of contrary data of the appellant/opponent, as discharging that burden.

(d) Finally, since the accuracy of the data of 4 December 2006 has not been challenged, the Board is also obliged to recognise this as evidence that the objective technical problem corresponds to that set out in paragraph [0008] of the patent in suit (see section 4.4.1, above) and that this problem has been credibly solved by the claimed subject-matter.

4.4.6 *Obviousness*

(a) D1 does not disclose either a general requirement for a functionality of about 2, nor does it contain any indication that any advantage would generally be attained by employing polyester polyols having a functionality of about two.

(b) Nor does D1 disclose that the polyester polyols thereof are the reaction product of the four components specified in the operative claims, as explained above. Although all four components are disclosed in D1 the teaching thereof is that those identified as (a), (b) and (d) in the operative claims are to be reacted and the resulting product may optionally be blended with a compound corresponding to that identified as (c) in the operative claims. It is neither explicitly disclosed nor even suggested that this compound might instead be reacted with the other co-reactants.

(c) Finally it is also apparent that the problem which D1 sets out to address is not the same as that underlying the patent in suit, although related thereto. Specifically D1 aims to improve the compatibility of the polyester polyols with blowing agents thus avoiding the need for compatibilisers, in order to produce rigid foams having high rigidity, friability resistance and burn char (see section 4.4.2 above). In contrast thereto the aim of the patent in suit, as explained in section 4.4.1 above is to provide low viscosity polyester polyols giving rise to CASE materials having optimised mechanical properties (see also section 4.4.4, above). Further, as regards the properties of the final products, certain of those, specifically tensile strength and adhesion discussed in the patent in suit (paragraph [0003]) are not addressed in D1.

(d) Hence D1 does not suggest the specific modifications which would be necessary to arrive at the claimed subject-matter for any reason, let alone to achieve an optimisation of CASE materials properties since D1 does not address these properties.
Accordingly D1 does not render the subject-matter claimed according to the third auxiliary request obvious.

4.5 *Request to consider D2 and D4*
At the oral proceedings before the Board the appellant/opponent sought to refer to D2 and D4 in support of its submissions with respect to inventive step (see section IX.(e) above). Neither of these documents had been relied upon in the argumentation presented in the statement of grounds of appeal, although both documents were referred to in the list of documents cited in the procedure (see section V.(a) above).
As held by this Board in a different composition (T 561/05 of 5 December 2007, not published in the OJ EPO, reasons 4.1 and 4.2) the requirement of Art. 10(a)2 of the Rules of Procedure of the Boards of Appeal then in force (corresponding to Art. 12(2) of the version which entered into force together with the revised version of the EPC), that the statement of grounds of appeal shall contain a party's complete case and in particular the requirement that this should **specify expressly** all the facts, arguments and evidence relied upon is not satisfied merely by a general reference to a document, or a general reference to submissions made in the opposition proceedings in the absence of the setting out of any pertinent facts or

arguments with respect to the elements thereof on which it is intended to rely.

The conclusion is that the attempt to introduce arguments based on the teachings of D2 and D4 at the oral proceedings before the Board, i.e. on the last possible day, constituted - inadmissibly - a change to the case presented in the statement of grounds of appeal.
Accordingly the Board did not permit submissions with respect to these documents.

4.6 In view of the foregoing it is concluded that the claims of the third auxiliary request meet the requirements of the EPC.

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 the new 3rd auxiliary request (claims 1 to 10) filed at the oral proceedings and after any necessary consequential amendment of the description.

Registrar Chairman

M. Schalow R. Young