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**D E C I S I O N**  
**of 14 March 2002**

**Case Number:** T 0981/99 - 3.3.3

**Application Number:** 96916511.7

**Publication Number:** 0828777

**IPC:** C08G 63/60

**Language of the proceedings:** EN

**Title of invention:**

Wholly aromatic thermotropic polyesters

**Applicant:**

HOECHST CELANESE CORPORATION

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56, 123(2)

**Keyword:**

"Amendment - added subject-matter (yes: main request and auxiliary requests I and II)"

"Inventive step - nonobvious restriction (auxiliary request VII)"

**Decisions cited:**

T 0201/83

**Catchword:**

-



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Boards of Appeal

Chambres de recours

**Case Number:** T 0981/99 - 3.3.3

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.3**  
**of 14 March 2002**

**Appellant:** HOECHST CELANESE CORPORATION  
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Somerville, N.J. 08876 (US)

**Representative:** Ackermann, Joachim, Dr.  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 3 May 1999 refusing  
European patent application No. 96 916 511.7  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** P. Kitzmantel  
**Members:** W. Sieber  
J. C. M. De Preter

## Summary of Facts and Submissions

- I. This appeal, which was filed on 8 July 1999, lies against the decision of the Examining Division dated 3 May 1999, refusing European patent application No. 96 916 511.7 filed on 20 May 1996 as PCT/US96/07277 in the name of Hoechst Celanese Corporation, and published under No. 0 828 777 (WO 96/38491). The appeal fee was paid together with the Notice of Appeal and the Statement of Grounds of Appeal was filed on 10 September 1999.
- II. The decision under appeal was based on a set of seven claims submitted with a letter dated 11 September 1998.

Claim 1 read as follows:

"1. An aromatic polyester having recurring monomer units derived from terephthalic acid, 6-hydroxy-2-naphthoic acid, p-hydroxybenzoic acid, 4,4'-biphenol, and resorcinol, wherein for every 100 moles of said recurring monomer units in said polyester, said polyester contains 20-40 moles p-hydroxybenzoic acid units, 10-40 moles 6-hydroxy-2-naphthoic acid units, 15-30 moles terephthalic acid units, 5-20 moles 4,4'-biphenol units, and 5-20 moles resorcinol units."

Claims 2 to 6 were dependent on Claim 1. Independent Claim 7 related to an aromatic polyester as defined in Claim 1 which is additionally characterised by its glass transition temperature, its inherent viscosity and its melt viscosity.

III. The decision under appeal held that the subject-matter of Claim 1 was novel over the disclosures of

D1: JP-A-06001836 (as referred to in Chemical Abstracts 120, 324490) and

D2: EP-A-0 450 932,

but that it lacked an inventive step over D2. In particular, it was considered obvious to the skilled person (i) to vary the amounts of comonomers of the polyesters derived from 4-hydroxybenzoic acid (HBA), 6-hydroxy-2-naphthoic acid (HNA), terephthalic acid (TA), 4,4'-dihydroxybiphenyl (BP) and 1,4-dihydroxybenzene (HQ = hydrochinon) and (ii) to replace the HQ moieties by units derived from 1,3-dihydroxybenzene (R = resorcinol).

This conclusion was drawn on the basis (i) that R was a common alternative monomeric unit in preparing anisotropic aromatic polyesters, as was known from documents D1,

D3: EP-A-0 337 727 and

D4: EP-A-0 049 617,

and (ii) that no evidence was on file demonstrating any unusual property being linked with said difference.

IV. With the Statement of Grounds of Appeal the Appellant submitted an amended set of eight claims of a main request; with its submission dated 5 February 2002 it filed seven claims of a first and eight claims of a second auxiliary request; and at the oral proceedings

held on 14 March 2002 it filed sets of each eight claims of a third and fifth auxiliary request as well as sets of each seven claims of a fourth, sixth and seventh auxiliary request.

(i) Claim 1 of the main request reads as follows:

"1. An amorphous aromatic polyester having recurring monomer units derived from terephthalic acid, 6-hydroxy-2-naphthoic acid, p-hydroxybenzoic acid, 4,4'-biphenol, and resorcinol wherein for every 100 moles of said recurring monomer units in said polyester contains 10-40 moles p-hydroxybenzoic acid units, 10-30 moles 6-hydroxy-2-naphthoic acid units, 20-30 moles terephthalic acid units, 5-20 moles 4,4'-biphenol units, and 10-20 moles resorcinol units."

(ii) The Claims 1 of the auxiliary requests essentially differ from the same claim of the main request by the following features:

(ii-1) First auxiliary request: by the additional feature that "said polyester has a glass transition temperature (Tg) in the range of 100-122°C, as measured by DSC".

(ii-2) Second auxiliary request: by the narrower range of 10 to 20 moles of BP units.

(ii-3) Third auxiliary request: by the narrower range of 20 to 40 moles of HBA units.

- (ii-4) Fourth auxiliary request: by the narrower range of 20 to 40 moles of HBA units and by the additional feature that "said polyester has a glass transition temperature (T<sub>g</sub>) in the range of 100-120°C, as measured by DSC".
- (ii-5) Fifth auxiliary request: by the narrower ranges of 20 to 40 moles of HBA units and of 10 to 20 moles of BP units.
- (ii-6) Sixth auxiliary request: by the narrower ranges of 20 to 40 moles of HBA units and of 10 to 20 moles of BP units as well as by the additional feature that "said polyester has a glass transition temperature (T<sub>g</sub>) in the range of 100-120°C, as measured by DSC".
- (ii-7) Seventh auxiliary request: by the narrower ranges of 20 to 40 moles of HBA units and of 15 to 20 moles of BP units as well as by the additional feature that "said polyester has a glass transition temperature (T<sub>g</sub>) in the range of 100-120°C, as measured by DSC".
- (iii) Apart from the respective Claims 1, the sets of claims of each request comprise two independent use claims which read as follows:

"Use of an amorphous polymer according to any of claims 1 to 5 (or 6) to form films and fibers and for structural and optical applications."

"Use of an amorphous polymer according to any of claims 1 to 5 (or 6) for transparent films for optical applications."

The remainder of the claims of the requests are dependent on the respective Claims 1.

V. The Appellant essentially argued that the claimed subject-matter of all requests was restricted to amorphous aromatic polyesters not having a melting point.

- (i) In its opinion, D1 neither anticipated nor suggested amorphous polyesters which are processable at lower temperatures. The Appellant's reworking of Example 1 (HBA/TA/BP/R) and Example 2 (HBA/TA/HQ/R) of D1 showed that these copolyesters were crystalline and had high melting points. The reference in D1, Example 8 to a HBA/HNA/TA/BP/R copolyester, which comprised the same monomer units as according to the claimed subject-matter, lacked an information as to the molar proportions of these units.
- (ii) The HBA/HNA/TA/BP/HQ copolyesters of D2 were also crystalline. There was no suggestion in D2 that by adjusting the molar ratios of the various units and by substituting R units for the HQ units amorphous copolyesters would be obtained having Tg's in the range of 100°C to 122°C.
- (iii) Concerning the possible insertion of BP units into the amorphous HBA/HNA/TA/R copolyesters according to document D4, which was identified in the Board's communication of 27 November 2001 as closest prior art, the Appellant argued that, in view of the symmetrical, linear structure of BP, the skilled person had expected that this measure would lead to crystalline copolyesters having

higher Tg's.

In the Appellant's opinion, this conclusion was supported by the crystallinity of the aforementioned copolyesters of D1 and D2 as well as by the crystallinity of the HBA/HNA/TA/BP polyesters of document

D6: (US-A-4 473 682).

- (iv) Moreover, it was not reasonable to assume that the incorporation of BP units into the copolyesters of document D4 was rendered obvious by the possible use of such units in the similar copolyesters of document

D5: US-A-4 219 461

because D4 considered its HBA/HNA/TA/R copolyesters as an improvement over the HBA/HNA/TA/HQ copolyesters of D5 and would not, therefore, have recourse to any information in D5.

- VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims filed with the Statement of Grounds of Appeal (main request) or on the basis of the first or second auxiliary request both filed with the submission dated 5 February 2002 or on the basis of the third, fourth, fifth, sixth or seventh auxiliary request, all submitted at the oral proceedings.

## Reasons for the Decision

1. The appeal is admissible.
2. *Amendments (Article 123(2) EPC)*
  - 2.1 Main request, first and second auxiliary request

The Claims 1 of these requests comprise the feature that for every 100 moles of recurring monomer units the claimed polyester contains 10 to 40 moles of HBA units.

The value of "10 moles" of the above range is, however, neither disclosed in the original application in a general way as limit of a range nor is there a specific disclosure of this value which would justify the broadening of the originally specified range of 20 to 40 moles HBA units (cf. Claim 2; page 2, lines 7 to 12) to 10 to 40 moles HBA units.

The only basis for this amendment could possibly be found in Example VII (cf. page 4, Table 1) which describes a HBA/HNA/TA/BP/R copolyester having the molar proportions 10/30/30/20/10. However, in view of the fact that the molar amounts of the TA (30) and BP (20) units comprised by this copolyester are themselves limit values of their respective molar ranges the composition of this copolyester does not lend itself to the generalisation of the amount of its HBA content which itself is an extreme value outside the originally defined HBA range. By contrast, this value is closely associated with the other molar ratios of Example VII (cf. T 201/83, OJ EPO 1984, 481).

Therefore, the Claims 1 of the main, the first and the second auxiliary request do not comply with the requirements of Article 123(2) EPC and these requests are thus not allowable.

2.2 Claim 1, third auxiliary request

- (i) The qualification "amorphous" of the claimed copolyesters is supported by the statements on page 1, lines 25 to 26 and page 2, lines 13 to 17 as well as by Examples I to IX (Table 1 on page 4), XV and XVI on page 5 of the original specification.
- (ii) The range of 20 to 40 moles of HBA is based on original Claim 2.
- (iii) The range of 10 to 30 moles HNA is based on the range of 10 to 40 moles according to original Claim 2 in combination with the value of 30 moles according to the copolyesters of Examples I, II, VII, VIII and IX (cf. Table 1 on page 4). The generalisation of the value of 30 is possible because it is disclosed together with various molar proportions of the other units, thus indicating that this value is not closely associated with the composition of just a single copolyester.
- (iv) The range of 20 to 30 moles TA is based on the range of 15 to 30 moles according to original Claim 2 in combination with Example I of Table 1. Although the figure "20" appears only in this single example, this amendment does not contravene the requirements of Article 123(2)

EPC because all molar amounts of the other units are fairly within the originally disclosed ranges and because the lower limit of 15 moles TA according to original Claim 2 is apparently associated with crystalline copolyesters which are no longer within the claimed scope (cf. Examples XII and XIII of Table 1).

- (v) The range of 5 to 20 moles BP is based on original Claim 2.
- (vi) The range of 10 to 20 moles R is based on the range of 5 to 20 moles according to original Claim 2 in combination with the value of 10 moles according to Examples I to VII of Table 1. The generalisation of this value is possible for the reasons set out in sub-point (iii) supra.
- (vii) Claim 1 of the third auxiliary request, therefore, complies with the requirements of Article 123(2) EPC.

### 2.3 Claim 1, fourth auxiliary request

In view of the above conclusion, this claim is also allowable under Article 123(2) EPC because it comprises a combination of the features of Claim 1 of the third auxiliary request with the range of glass transition temperatures according to original Claim 7.

### 2.4 Claim 1, fifth auxiliary request

This claim only differs from Claim 1 of the third auxiliary request by the restriction of the BP range from 5 to 20 to 10 to 20 moles. This amendment is not

objectionable under Article 123(2) EPC because the value of 10 moles BP is supported by Examples I and VIII of Table 1 which discloses this value in combination with varying amounts (apart for the amount of HNA) of the other repeating units.

2.5 Claim 1, sixth auxiliary request

This claim is also allowable under Article 123(2) EPC because it comprises a combination of the features of Claim 1 of the fifth auxiliary request with the range of glass transition temperatures according to original Claim 7.

2.6 Claim 1, seventh auxiliary request

This claim is only different from Claim 1 of the sixth auxiliary request by the amendment of the range of BP units to 15 to 20 moles. This range is based on the range of 5 to 20 moles according to original Claim 2 in combination with the value of 15 moles according to Examples II, III and IV of Table 1 which disclose copolyesters having varying amounts of the other units (apart from the R units). The generalisation of this value is thus possible for the reasons set out in point 2.2 (iii) supra.

2.7 The use claims of all requests (cf. Section IV (iii) supra) are based on the statements on page 2, lines 25 to 28 of the original specification.

2.8 The dependent claims of all requests are fairly based on the original specification, in particular on original Claims 3, 4, 5, 6 and/or 7.

2.9 The sets of Claims of the auxiliary requests III to VII therefore all comply with the requirements of Article 123(2) EPC.

3. *State of the art*

3.1 Document D1 (English translation provided by the Appellant during the appeal procedure)

This document discloses the preparation of mouldable, impact resistant and heat resistant copolyesters comprising 5 to 95 mol% moieties from HBA and/or HNA, 2.5 to 47.5 mol% R moieties, and 2.5 to 47.5 mol% aromatic dicarboxylic acid moieties.

Example 1 describes the polycondensation of 70 moles HBA, 5 moles BP, 10.9 moles R and 15 moles TA.

Example 8 relates to polyesters comprising units from HBA, HNA, TA, BP and R but does not specify any molar proportions.

3.2 Document D2

Claim 1 of this document relates to a melt-processable polyester capable of forming an anisotropic melt phase at a temperature below 375°C which exhibits a heat deflection temperature of at least 250°C consisting essentially of 1.4 to 10 mole percent of HNA moieties I, 50 to 70 mole percent of HBA moieties II, 10 to 24.3 mole percent of TA moieties III, 1 to 12.15 mole percent of HQ moieties IV, and 5 to 23.3 mole percent of BP moieties V, with the provisos that the molar concentration of moiety III is substantially the same as the total molar concentration of moieties IV and V, and that the molar concentration of moiety IV does not

exceed that of moiety V.

3.3 Document D3

Claim 1 of this document relates to crystalline polyester resins exhibiting optical anisotropy in the molten state which comprise 35 to 90 mol% of HBA units I, 0.5 to 20 mol% of HNA units II, 0.5 to 45 mol% of R units III, 0.5 to 45 mol% of HQ units IV and 0.5 to 45 mol% of TA or IA (isophthalic acid) units V.

3.4 Document D4

Claim 1 of this document relates to a melt processable wholly aromatic polyester capable of forming an anisotropic melt phase at a temperature below 350°C consisting essentially of 5 to 60 mole percent of recurring HNA moieties I, 5 to 70 mole percent of HBA moieties II, 10 to 45 mole percent of TA moieties III, and 10 to 45 mole percent of R moieties IV.

Claim 5 indicates molar proportions of the moieties I/II/III/IV of approximately 15-25/25-35/20-30/20-30.

The Example (page 12, line 23 to page 14, line 8) describes a HNA/HBA/TA/R polyester having the molar proportions 20/30/25/25 which exhibits a "strong glass transition inflection at approximately 123°C" and has no detectable melting point (page 13, lines 30 to 33). The corresponding comparative polyester wherein the R units were replaced by HQ units exhibits a Tg of 90°C and a melting temperature of 305°C (cf. page 14, lines 6 to 23).

According to page 8, lines 8 to 16, in addition to the

four essential moieties, minor amounts ("e.g., less than 10 mole percent") of other ester-forming moieties, comprising e.g. "dioxy units", may be included in the polyester "so long as such other moieties do not adversely influence the desired optically anisotropic melt phase ... and do not raise the melting point of the resulting polymer above that specified."

3.5 Document D5

Claim 1 of this document relates to a melt processable wholly aromatic polyester capable of forming an anisotropic melt phase at a temperature below approximately 320°C consisting essentially of approximately 20 to 40 mole percent of recurring HNA moieties I, 10 to 50 mole percent of HBA moieties II, more than 5 up to about 30 mole percent of symmetrical dioxy aryl moieties [-O-Ar-O-] III, and more than 5 up to about 30 mole percent of symmetrical dicarboxy aryl moieties [-CO-Ar'-CO-] IV.

Claim 5 indicates molar proportions of the moieties I/II/III/IV of approximately 20-30/25-40/15-25/15-25.

According to column 6, lines 57 to 66, in addition to the four essential moieties, minor amounts ("e.g., up to about 10 mole percent") of other ester-forming moieties, comprising e.g. "dioxy units", may be included in the polyester "so long as such other moieties do not adversely influence the desired anisotropic melt phase ... and do not raise the melting point of the resulting polymer above that specified."

3.6 Document D6

Claim 1 of this document relates to a melt processable polyester capable of forming an anisotropic melt phase at a temperature of below approximately 400°C consisting essentially of approximately 3 to 10 mole percent of recurring HNA moieties I, 20 to 70 mole percent of HBA moieties II, 7.5 to 38.5 mole percent of BP moieties III, and 7.5 to 38.5 mole percent of HQ moieties IV.

4. *Novelty, auxiliary requests III to VII*

The subject-matter of all these requests is novel because none of the available citations discloses a polyester meeting all of the respective compositional requirements.

5. *Closest prior art, auxiliary request III to VII*

Document D4 represents the nearest state of the art because its Claim 5 discloses amorphous copolyesters having the four repeating units HBA, HNA, TA and R in common with the claimed copolyesters, the molar proportions of three of which (HBA, HNA, TA) are within the respectively claimed ranges, while the molar range of 20 to 30 of the fourth unit (R) overlaps at its lower limit the range of 10 to 20 according to the Claims 1 of auxiliary requests III to VII.

Moreover, D4 comprises the teaching that less than 10 mole percent of further units, including "dioxy units" may be incorporated. It is apparent that the presence of such units would be at the expense of the molar amount of the obligatory "dioxy unit" R because the total amount of the "dioxy units" must match the molar amount of the "dicarboxy unit" TA. Thereby the existing

overlap of the molar amount of the R units according to D4 and according to the claimed invention would be enhanced.

6. *Problem and solution, auxiliary requests III to VII*

6.1 According to page 2, lines 13 to 17 and 27 to 28 of the original specification the problem **subjectively** underlying the respectively claimed subject-matters resides in the provision of amorphous copolyesters exhibiting a glass transition temperature Tg "in the **approximate** range of 100-120°C" [emphasis by the Board] which copolyesters are *inter alia* suitable for the preparation of transparent films for optical applications.

6.2 In view of the fact that D4 already discloses very similar amorphous copolyesters whose Tg of "approximately 123°C" (cf. page 13, lines 30 to 33 of D4) is in the **approximate** range of 100 to 120°C the problem which **objectively** exists vis-à-vis this document can only be seen in the provision of further similar amorphous copolyesters.

6.3 This problem is to be solved by the incorporation of BP units in certain amounts (auxiliary requests III and IV: 5 to 20 moles; auxiliary requests V and VI: 10 to 20 moles; auxiliary request VII: 15 to 20 moles).

6.4 On the basis of the available evidence (cf. pages 4 and 5 of the original specification: Table 1, Examples I to IX, Examples XV and XVI) the Board is satisfied that by this measure the objectively existing technical problem as set out in point 6.2 supra has effectively been solved.

7. *Obviousness*

7.1 Auxiliary requests III and V

This issue turns on the question whether, for the skilled person looking for a solution of the objectively existing technical problem, there was any clue in the prior art towards the subject-matter of these Claims 1, in particular for the incorporation of 5 to 20 and 10 to 20 moles, respectively, of BP units into the copolyesters according to Claim 5 of D4.

7.1.1 In the Board's judgment, this measure is obvious because by the suggestion in D4 (page 8, lines 8 to 16) of the possible presence of further ester-forming moieties, including "dioxy units", in an amount of "e.g. less than 10 mole percent" the skilled person is incited to investigate the suitability of variations of the copolyester compositions according to Claim 5 of D4 by incorporating other comonomer units which are common in this art in amounts which are covered by this statement. In this respect an amount of 10 mole percent of further "dioxy units" units is considered by the skilled person to be within the meaning of "e.g. less than 10 mole percent". Whilst formally the value of 10 is beyond that definition, a conclusion concerning the issue of inventive step that is applicable to an amount which is somewhat less than 10 mole percent must also apply to an amount of precisely 10 mole percent.

7.1.2 That BP units belong to the kind of repeating units which are common in this art is apparent from the reference in Example 8 of document D1 (cf. page 19, item [0059] of the translation) which discloses copolyesters comprising the same five units which are

used according to the claimed invention, BP units inclusive.

- 7.1.3 Similarly, document D5 discloses that BP units belong to the class of "dioxy aryl units" which are normally considered by the person skilled in this art (cf. Claim 7, third formula in combination with column 6, lines 56 to 66). The fact that the copolyesters of D4 are to some extent considered an improvement over those of D5 (cf. D4, page 14, lines 9 to 23) does not affect the aspect of the disclosure of D5 concerning the availability of such "dioxy aryl units" to one skilled in the art.
- 7.1.4 The obviousness conclusion drawn in point 7.1.1 supra is not invalidated by the fact that D4 contains the proviso that "other moieties do not adversely influence the desired optically anisotropic melt phase ... and do not raise the melting point ... above that specified" (cf. point 3.4 supra) because the skilled person had no reason to assume that the incorporation of 5 moles (auxiliary request III) or 10 moles (auxiliary request V) of BP units would (necessarily) impair the relevant properties of the copolyesters of D4 including its amorphous character.

This is evident from the fact that the HBA/HNA/TA/HQ (molar ratios: 30/20/25/25) copolyester of Comparative Example of D4, in which the asymmetrical R units of the corresponding "inventive" Example had been replaced by symmetrical "dioxy units" HQ, exhibits a melting temperature (305°C: page 14, line 21) which is similar to that of the "inventive" copolyester ("slightly in excess of 300°C": page 14, lines 6 to 8), preserve the anisotropic melting characteristics and even exhibit a

lower Tg of 90°C, as compared with the Tg of about 123°C of the "inventive" copolyester (page 14, line 19 to 21 vs. page 13, lines 30 to 32).

It therefore appears that the skilled person, in spite of its awareness of the common general knowledge that symmetrical, para-substituted units, like BP moieties, tend to foster crystallinity, is not prohibited by the afore-mentioned warning in D4 to investigate the feasibility of copolyesters according to Claim 5 of D4 which comprise low amounts (up to 10 mole percent) of BP units.

7.1.5 Nor would the skilled person be discouraged by the evidence adduced by the Appellant to investigate the suitability of the introduction of BP units into the HBA/HNA/TA/R copolyesters of D4 whilst conserving their amorphous structure, because the copolyesters of all the examples of D1, D2 and D6 to which the Appellant pointed comprise high amounts of linear, symmetrical units like HBA, TA, BP and/or HQ units and relatively low, if any, amounts of non-symmetrical R or crank-shaft structured HNA units:

- D1, Examples 1 (HBA/TA/BP/R) and 2 (HBA/TA/R/HQ): 70/65 HBA, no HNA, 15/17.5 TA, 5/0 BP, 0/5.6 HQ, 10.9/13.0 R;
- D2, Example 1 (HBA/HNA/TA/BP/HQ) and Comparative Example (HBA/HNA/TA/BP): 61/61 HBA, 2.5/2.5 HNA, 16.25/18.25 BP, 2/0 R;
- D6, Examples 1 to 25 (HBA/HNA/TA/BP): 45 (Example 11) to 70 HBA (Example 16), 3 (Examples 24, 25) to 10 (Example 1) HNA, 12.5

(Example 16) to 25 (Example 11) TA, 12.5

(Example 16) to 25 (Example 11) BP.

The fact that all these copolyesters are crystalline and exhibit relatively high softening temperatures only confirms the expectation the skilled person may derive from its common general knowledge as reflected in D1 (page 5, item [0003]), namely that copolyesters from HBA, TA and HQ exhibit high softening temperatures and poor formability, i.e. properties which are typical for the crystalline structures emerging from the strict symmetry and linearity of these units. The same disadvantageous melt processing properties are of course to be expected from the copolyesters referred to above which are predominantly constituted by such symmetrical and linear units.

## 7.2 Auxiliary requests IV and VI

The Claims 1 of these requests are different from the corresponding claims of auxiliary requests III and V, respectively, by the additional feature that "said polyester has a glass transition temperature (T<sub>g</sub>) in the range of 100-120°C, as measured by DSC".

Since the glass transition temperature is a direct consequence of the molar proportions of the repeating units, it does not contribute an element which is independent from the structural composition of the copolyesters. Nor is the available evidence able to demonstrate a critical importance of the limiting values of the specified range of 100 to 120°C.

It follows that the conclusions of obviousness drawn above with respect to auxiliary request III and V also

apply to auxiliary requests IV and VI.

7.3 Auxiliary request VII

7.3.1 Claim 1

In the Board's judgment, the restriction of the molar amounts of the BP units to the range of from 15 to 20 mole percents renders the subject-matter of Claim 1 of this request non-obvious.

Whilst, as discussed with respect to the auxiliary requests III to VI, document D4 suggests the introduction into its HBA/HNA/TA/R copolyesters of "dioxy units" like BP units in amounts up to 10 mole percent, it does not consider the use of much higher amounts. It must be concluded from the statement on page 8, lines 8 to 16 which sets an upper limit for such units of about 10 mole percent and warns against adverse influences of inappropriate units in inappropriate amounts that molar amounts far in excess of 10 percent would impair the properties of the copolyesters. This danger is, of course, greater if units are incorporated which are structurally stiff and linear like BP which, on the basis of common general knowledge, must be expected to foster crystallinity, raise the melting temperature and impair the melt processability.

The overall teaching of D4, thus, militates against the incorporation of BP units into the HBA/HNA/TA/R copolyesters in amounts which are **far above** the disclosed upper limit of about 10 mole percent. A lower limit of the amount of BP of 15 mole percent which exceeds the 10 mole percent limit of D4 by 50% is

indeed considered to be **far above** this limit.

The subject-matter of Claim 1 of auxiliary request VII therefore complies with the requirements of Article 56 EPC.

- 7.3.2 The subject-matter of dependent Claims 2 to 5 and of the use Claims 6 and 7 comprises all features of Claim 1 and the conclusion of non-obviousness therefore applies also to these claims.
8. In the Board's judgment, the claims of auxiliary request VII also meet the further requirements of the EPC, in particular those of Article 84 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 grant a patent on the basis of the claims submitted as seventh auxiliary request at the oral proceedings and after any necessary consequential amendment of the description.

The Registrar

The Chairman:

E. Görgmaier

P. Kitzmantel