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**Datasheet for the decision  
of 10 January 2024**

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**Language of the proceedings:** EN

**Title of invention:**  
BIODEGRADABLE COMPOSITION COMPRISING POLYMERS OF NATURAL  
ORIGIN AND ALIPHATIC-AROMATIC COPOLYESTERS

**Patent Proprietor:**  
Novamont S.p.A.

**Opponent:**  
bio-tec Biologische Naturverpackungen GmbH & Co. KG

**Relevant legal provisions:**  
RPBA 2020 Art. 12(4)  
EPC Art. 56

**Keyword:**

Amendment to case - amendment admitted (no and yes)  
Inventive step - (no; all requests)

**Decisions cited:**

G 0007/93, T 0035/85, T 0197/86, T 0439/92, T 0939/92,  
T 0971/11



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**Case Number: T 1359/22 - 3.3.03**

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 10 January 2024**

**Appellant:** bio-tec Biologische Naturverpackungen GmbH & Co.  
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**Decision under appeal:** **Decision of the Opposition Division of the European Patent Office posted on 30 March 2022 rejecting the opposition filed against European patent No. 3284767 pursuant to Article 101(2) EPC.**

**Composition of the Board:**

**Chairman** D. Semino  
**Members:** O. Dury  
L. Basterreix

## Summary of Facts and Submissions

I. The appeal of the opponent is against the decision of the opposition division rejecting the opposition filed against European patent No. 3 284 767.

II. The following documents were, among others, cited in the decision under appeal:

D4: DE 10 2005 053 068 A1

D5: WO 96/31561 A1

D6: EP 2 163 567 A2

D7: WO 2006/097354 A1

D8: WO 2006/097355 A1

D11: WO 2009/135921 A1

D19: Communication dated 3 January 2022 of the Board of Appeal in appeal case T 407/19, related to EP 2 496 644 B1

D19a: EP 2 496 644 B1 (patent at stake in D19)

III. As far as relevant to the present case, the following conclusions were reached in the decision under appeal:

- Documents D19 and D19a were not admitted into the proceedings.
- The subject-matter of claim 1 as granted involved an inventive step when document D4 was taken as the closest prior art.

In view of the above and since none of the other objections put forward by the opponent were successful, the opposition was rejected.

- IV. The opponent (appellant) appealed against the above decision.
- V. With their rejoinder to the statement of grounds of appeal the patent proprietor (respondent) filed nine sets of claims as auxiliary requests 1 to 9.
- VI. In a communication accompanying the summons to oral proceedings, the Board indicated specific issues to be discussed at the oral proceedings.
- VII. Oral proceedings were held on 10 January 2024.
- VIII. **The final requests of the parties were as follows:**
- (a) The appellant requested that the decision under appeal be set aside and the patent be revoked.
- (b) The respondent requested that the appeal be dismissed (main request) or, in the alternative, that the decision under appeal be set aside and the patent be maintained in amended form on the basis of any of auxiliary requests 1 to 9 filed with their rejoinder to the statement of grounds of appeal.
- IX. Claim 1 of the **main request** (claim 1 as granted) read as follows:
- "1. Composition comprising:
- (A) at least one biodegradable aliphatic-aromatic copolyester obtainable starting from mixtures comprising at least one diol, at least one polyfunctional aromatic acid and at least two aliphatic dicarboxylic acids, **characterized in that** the content

of said aromatic acids is comprised between 48 and 70 % by moles with respect to the total molar content of dicarboxylic acids and the aliphatic dicarboxylic acids comprise:

i. 51 to 95% by moles of at least one diacid C4-C6;

ii. from 5 to 49 % by moles of at least one long chain diacid having more than 6 carbon atoms in the main chain selected from the group consisting of suberic acid, azelaic acid, sebacic acid, dodecanedioic acid, brassylic acid, octadecandioic acid, their esters and mixtures thereof;

(B) at least one polymer of natural origin;

wherein the concentration of (A), with respect to (A+B) is > 40 % by weight, said composition having a Melt Flow Index (MFI) of 1,5-10 g/10 min, said MFI being measured at 160°C and 5kg according to ASTM 1238-89."

X. Claim 1 of **auxiliary request 1** differed from claim 1 of the main request in that component (B) was defined as follows (additions as compared to claim 1 of the main request in **bold**):

"(B) at least one polymer of natural origin, **which is selected from starch, cellulose, chitin, chitosan, alginates, proteins such as gluten, zein, casein, collagen, gelatin, natural rubbers, rosin acid and its derivatives, lignins and their derivatives;**".

XI. Claim 1 of **auxiliary request 2** differed from claim 1 of the main request in that the polyfunctional aromatic acid was further defined as follows:

"wherein said polyfunctional aromatic acid of said at least one biodegradable aliphatic-aromatic copolyester (A) is selected from terephthalic acid and its esters and 2,5-furandicarboxylic acid and its esters, and mixtures thereof,".

XII. Claim 1 of **auxiliary request 3** differed from claim 1 of the main request in that it contained the amendments made in claim 1 of each of auxiliary requests 1 and 2.

XIII. Claim 1 of **auxiliary requests 4 and 5** differed from claim 1 of auxiliary request 3 in that the higher end of the range of the content of the aromatic acid(s) was amended to "60 % by moles" and "53 % by moles", respectively (instead of "70 % by moles").

XIV. Claim 1 of **auxiliary request 6** differed from claim 1 of auxiliary request 5 in that:

(a) the diol was limited to 1,4-butanediol;

(b) the lower end of the range of the content of the polyfunctional aromatic acid(s) was increased to "49 % by moles" (instead of "48 % by moles");

(c) the higher end of the range of the content of the aliphatic dicarboxylic acid i) was limited to "70 % by moles" (instead of "95 % by moles");

(d) the lower end of the range of the content of the aliphatic dicarboxylic acid ii) was increased to "30 % by moles" (instead of "5 % by moles")."

XV. Claim 1 of **auxiliary request 7** differed from claim 1 of auxiliary request 6 in the following amendments:

- Component (B) was defined as follows:

"(B) at least one polymer of natural origin, which is selected from starch and its derivatives;"

- The range of the concentration of (A), with respect to (A+B), was amended to "> 60 % by weight" (instead of "> 40 % by weight").
- The range for the MFI feature was amended to "2-7 g/10 min" (instead of "1,5-10 g/10 min").

XVI. Claim 1 of **auxiliary request 8** differed from claim 1 of auxiliary request 7 in that the embodiment "2,5-furandicarboxylic acid and its esters" was deleted from the definition of the polyfunctional aromatic acid(s), which therefore read as follows:

"wherein said polyfunctional aromatic acid of said at least one biodegradable aliphatic-aromatic copolyester (A) is selected from terephthalic acid and its esters, and mixtures thereof,"

XVII. Claim 1 of **auxiliary request 9** differed from claim 1 of auxiliary request 8 in that the definition of the aliphatic dicarboxylic acids was as follows:

"and the aliphatic dicarboxylic acids comprise:

i. from 51 to 70 % by moles of adipic acid;

ii. from 30 to 49 % by moles of sebacic acid;"

XVIII. The appellant's arguments, in so far as relevant to the present decision, may be summarised as follows:



- (a) Documents D19 and D19a should be admitted into the proceedings.
- (b) The subject-matter of claim 1 of the main request did not involve an inventive step when example 2 of D4 was taken as the closest prior art. The same conclusion was valid for claim 1 of each of auxiliary requests 1 to 9 (should auxiliary requests 6 to 9 be admitted).
- (c) Auxiliary requests 6 to 9 should be not admitted into the proceedings.

XIX. The respondent's arguments, in so far as relevant to the present decision, may be summarised as follows:

- (a) Documents D19 and D19a should be not admitted into the proceedings.
- (b) The subject-matter of claim 1 of the main request involved an inventive step when example 2 of D4 was taken as the closest prior art. The same conclusion was valid for claim 1 of each of auxiliary requests 1 to 9.
- (c) Auxiliary requests 6 to 9 should be admitted into the proceedings.

## **Reasons for the Decision**

- 1. Admittance of D19 and D19a
  - 1.1 The appellant contested the decision of the opposition division not to admit D19 and D19a into the

proceedings.

*Request to overturn the decision of the opposition division*

- 1.2 According to the case law, an opposition's division discretionary decision may be overruled by the Boards if it is established that the opposition division did not exercise its discretion in accordance with the right principles or in an unreasonable way (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, V.A.3.4.1.b; G 7/93: section 2.6 of the reasons).

In the present case, the Board considers that the appellant has not explained why they considered that the opposition division did not properly exercise its discretion (statement of grounds of appeal: page 3, second full paragraph; section VII.2.1). In that respect, the mere indication that the decision of the opposition division was "incorrect" (appellant's letter of 6 December 2023: page 2, first paragraph) is a simple conclusion, which is in itself insufficient for the Board to understand why the appellant disagrees with the findings of the opposition division. In particular, it is apparent from section 2.2 of the reasons of the decision under appeal that the opposition division reached their conclusion considering both the time of filing of D19/D19a and the *prima facie* relevance of these documents. Therefore, the Board is satisfied that the opposition division used the right principles to take their decision. For these reasons, it is not justified for the Board to overturn the decision of the opposition division not to admit D19 and/or D19a into the proceedings for the reason that they did not properly exercised their discretion.

*Admission of the documents as filed with the statement of grounds of appeal*

- 1.3 According to established case law, the fact that the opposition division did not admit a late-filed document and did not exceed the proper limits of its discretion by not admitting it, does, in principle, not prevent the Board from admitting the document (T 971/11, sections 1.1 to 1.3 of the reasons; Case Law, *supra*, V.A.3.4.3.a). In particular, a submission which would have been admitted into appeal proceedings if it had been filed for the first time at the outset of those proceedings should not be held inadmissible for the sole reason that it was already filed before the department of first instance and not admitted (T 971/11, section 1.3 of the reasons).
- 1.3.1 In the present case, the appellant put forward that D19 and D19a were filed at the earliest possibility, in particular shortly after D19 had been made available (which was very shortly before the oral proceedings before the opposition division).
- 1.3.2 In the Board's view, this argument may be seen as a specific procedural circumstance of the present case, which may justify why these documents were filed so late during the opposition proceedings. Under these circumstances, the admittance of D19 and D19a is subject to the discretion of the Board which, pursuant to Article 12(4) RPBA (last sentence), shall be exercised in view of *inter alia* the complexity of the amendment, the suitability of the amendment to address the issues which led to the decision under appeal, and the need for procedural economy.

1.3.3 The appellant relied on D19 and D19a to argue that the present case was closely related to the one dealt with in appeal case T 407/19 ("sister case") and pointed out that the criteria retained by the Board to assess inventive step in that other case should also be used in the present case (statement of grounds of appeal: page 3, second full paragraph; section VII.2.1, in particular the last paragraph on page 57 and the first paragraph on page 58). In particular, the appellant identified the facts that the technical effect relied upon for the formulation of the problem solved over the closest prior art should be credible over the entire range claimed and that comparative data should allow a fair comparison on the basis of which the effect being claimed may be seen to be related to the distinguishing features.

a) However, the criteria mentioned by the appellant are very commonly used for the assessment of inventive step. Therefore, there is no need to admit D19 and D19a on that basis.

b) In addition, although the present case is based on a divisional application of the application underlying D19a, the subject-matter being claimed in the present case differs from the one claimed in D19a, in particular regarding the definition of the polyfunctional aromatic acid(s) and of the aliphatic dicarboxylic acids used to prepare the biodegradable aliphatic-aromatic copolyesters defined in claim 1 of the patent in suit in both cases (see also rejoinder: section 6.3, see in particular the bottom of page 32 and the top of page 33). Therefore, the Board shares the respondent's view that the specifics of D19 and D19a are not mandatorily relevant for the present case. In any case, D19 is a preliminary opinion, which is not

binding (as explicitly indicated in section 1 thereof). In that regard, the Board does not share the appellant's view that such a preliminary opinion "belongs to the jurisprudence" and, as a consequence, "should always be admissible at any stage of the proceedings" (letter of 6 December 2023: page 2, third paragraph).

c) For these reasons, the Board found it appropriate to make use of its discretion pursuant to Article 12(4) RPBA by not admitting documents D19 and D19a into the proceedings.

**Main request (patent as granted)**

2. Inventive step

2.1 Closest prior art

It was common ground between the parties that document D4 could suitably be taken as the closest prior art and that example 2 thereof constituted a particularly relevant starting point for the assessment of inventive step, as put forward by the appellant (statement of grounds of appeal: section VII.3.2; see in particular page 69, second paragraph). The Board has no reason to deviate from that view.

2.2 Distinguishing features

2.2.1 Example 2 of D4 (bottom of page 13) discloses a biodegradable aliphatic-aromatic copolyester ("AAPE" in the following) prepared using 1,4-butanediol as the sole diol together with a mixture of aromatic and aliphatic acids, namely 45 mol.% terephthalic acid (i.e. a polyfunctional aromatic acid according to

claim 1 of the main request) and a 1:1 molar mixture of adipic acid and sebacic acid (i.e. aliphatic dicarboxylic acids according to components i) and ii) as defined in claim 1 of the main request, each in an amount of 27,5 mol.%). In addition, according to the general teaching of D4, an AAPE such as the one prepared in example 2 thereof can be used in a mixture with other biodegradable polyesters to prepare a biodegradable polyester blend (see e.g. D4: claims 4, 5 and 7).

2.2.2 It was common ground that the subject-matter of claim 1 of the main request differed from the disclosure of example 2 of D4 at least in the following features:

- (a) The content of polyfunctional aromatic acid of component (A) (between 48 and 70 mol.% in operative claim 1 vs. 45 mol.% in example 2 of D4);
- (b) The specific amounts of each of the aliphatic dicarboxylic acids i) and ii) (51-95 mol.% and 5-49 mol.%, respectively, in operative claim 1 vs. 50 mol.% and 50 mol. %, respectively, in example 2 of D4).

2.2.3 Although it is derivable from the disclosure of D4 as a whole that an AAPE such as the one prepared in example 2 thereof can be blended with other biodegradable polyesters to prepare a biodegradable polyester mixture, no blend comprising an AAPE according to said example 2 of D4 together with another biodegradable polyester is disclosed in D4.

a) In that regard, it was in dispute between the parties whether or not the polyesters which are indicated as additional biodegradable polyesters of the

blend according to component ii) of claims 4 or 5 of D4 are "polymers of natural origin" according to component (B) of claim 1 of the main request (statement of grounds of appeal: page 34, last paragraph to page 35, second paragraph; rejoinder: page 16, fourth paragraph). In particular, the respondent considered that the definition of these polymers (B) in operative claim 1 was limited to polymers which occurred in nature but did not encompass polymers which were made of monomers of natural origin. This was in particular derivable from paragraph 56 of the patent in suit.

b) However, according to accepted case law, the normal rule of claim construction is that the terms used in a claim should be given their broadest technically sensible meaning in the context of the claim in which they appear. In that respect, there is no evidence on file that the expression "polymer of natural origin" present in feature (B) of operative claim 1 has an unambiguous and accepted definition in the art. Paragraph 56 of the patent in suit, which was referred to by the respondent, is only related to specific embodiments of component (B) and cannot serve to limit the scope of operative claim 1. Therefore, in view of the evidence on file, it is agreed with the appellant that the wording "polymer of natural origin" encompasses not only polymers which can be found as such in nature but also polymers which are made of/derived from monomers of natural origin. In that respect, the Board does not share the view of the respondent (as put forward at the oral proceedings) that the fact that in the patent in suit polymers such as the ones mentioned in claim 4 of D4 are considered as additional components, different from the "polymers of natural origin" according to the patent in suit (see e.g. paragraphs 104-105 of the patent in suit), is

sufficient to conclude that the polymers according to claim 4 of D4 are not "polymers of natural origin". Also, the respondent's argument put forward at the oral proceedings before the Board that the skilled person would understand, based on common general knowledge, that D4 was directed to blends of AAPE with polymers of synthetic origin and not with polymers of natural origin fails to convince, as no such common general knowledge has been provided.

c) In view of the above, the Board shares the view of the appellant that with the exception of polycaprolactone, the biodegradable homo- and copolyesters according to component ii) of the mixture of claim 4 of D4 are "polymers of natural origin" according to component (B) of claim 1 of the main request (statement of grounds of appeal: page 34, last paragraph to page 35, second full paragraph). Nevertheless, since not all embodiments of component ii) indicated in claim 4 of D4 are polymers of natural origin, it remains that in order to arrive at a polymer of natural origin according to component (B) of claim 1 of the main request, a specific choice between the alternatives disclosed in claim 4 of D4 (such as the ones disclosed in claim 5 of D4) has to be made.

2.2.4 Although D4 discloses ranges for the amounts of the AAPE (which can be the one prepared in example 2 of D4) and the additional polyester compound ii) (which can be a polymer of natural origin according to component B) of operative claim 1) that overlap with the definition of the concentration of (A), with respect to (A+B) according to operative claim 1 (> 40 w.% in claim 1; see e.g. amounts of components i) and ii) in claims 4 and 7 of D4), it remains that a specific choice within



the disclosure of D4 has to be made in order to arrive at a concentration of component (A) (i.e. the AAPE) as defined in operative claim 1.

2.2.5 In addition, it was not disputed by the appellant, in particular at the oral proceedings before the Board, that D4 does not disclose any information regarding the MFI feature according to operative claim 1 (rejoinder: section 5.3; Board's communication: point 7.2.3). In particular, D4 fails to disclose a composition that exhibits an MFI measured at 160°C and 5 kg according to ASTM 1238-89 in the range indicated in claim 1 of the main request, let alone a composition comprising an AAPE according to example 2 thereof and a polymer of natural origin.

2.2.6 In view of the above, it is agreed with the respondent that the subject-matter of claim 1 of the main request differs from the disclosure of the AAPE according to example 2 of D4 in the following features:

- (a) The content of polyfunctional aromatic acid of component (A);
- (b) The amounts of each of the two aliphatic dicarboxylic acids i) and ii) of component (A);
- (c) The combination of an AAPE prepared from a polyfunctional aromatic acid and two aliphatic dicarboxylic acids i) and ii) in the required amounts with a "polymer of natural origin" (component (B) according to operative claim 1);
- (d) The specific concentration of the AAPE as defined in operative claim 1 (concentration of (A), with

respect to (A+B));

(e) The specific MFI of the composition as defined in operative claim 1.

2.3 Technical problem effectively solved over the closest prior art

2.3.1 At the oral proceedings before the Board, the respondent considered that the problem to be solved as compared to example 2 of D4 was to provide a different type of blend with improved mechanical properties. In that respect, it was known in the art that increasing the amount of aromatic acids of the AAPE led to increased mechanical properties. Also, the comparative data filed with the patent proprietor's submission of 26 October 2020 (page 15) demonstrated an improvement in terms of mechanical properties in relation to the specific amounts of dicarboxylic acids i) and ii) of component (A), so the respondent.

2.3.2 In that regard, it is first noted that the effect on biodegradability, which was relied upon in writing but was contested by the appellant and for which the Board had expressed concerns in its communication, was not relied upon by the respondent any more at the oral proceedings.

2.3.3 In addition, it was common ground that it belonged to common general knowledge that mechanical properties of an AAPE may be improved by using a larger aromatic content. The Board has no reason to be of a different opinion.

2.3.4 Regarding an effect related to the specific amounts of aliphatic dicarboxylic acids i) and ii) as defined in

operative claim 1, the appellant contested that the experimental data filed with the patent proprietor's submission of 26 October 2020 (page 15) should be taken into account because the data relied upon were post-published and because the effect was not explicitly taught in the patent in suit.

Although the appellant's objection did not convince the Board, the Board arrived at the conclusion that an inventive step was not to be acknowledged even if, to the respondent's benefit, the experimental data filed with the patent proprietor's submission of 26 October 2020 (page 15) were taken into account. Under these circumstances, there is no need for the Board to elaborate any further on that issue in the present decision, i.e. it is considered hereinafter that the experimental data filed with the patent proprietor's submission of 26 October 2020 (page 15) can be relied upon.

2.3.5 The experimental data filed with the patent proprietor's submission of 26 October 2020 (page 15) concern a comparison of example 1 of the patent in suit, which is illustrative of the subject-matter of claim 1 of the main request, with a composition only differing therefrom in that a different AAPE, not according to claim 1 of the main request was used: whereas the AAPE of said example 1 was AAPE-1 as defined below, the AAPE of the comparative example was AAPE-2:

AAPE-1 (according to operative claim 1 and used in example 1 of the patent in suit): 50% mol Terephthalic Acid, 26% mol Adipic Acid and 24% mol Sebacic acid having MFR of 3 g/10 min (**ratio i/ii of 52/48**).

AAPE-2 (comparative): 50% mol Terephthalic Acid, 15% mol Adipic Acid and 35% mol Sebacic acid having MFR of 3 g/10 min (**ratio i/ii of 30/70**).

a) The appellant put forward that the above experimental data did not constitute a proper comparison with the closest prior art (statement of grounds of appeal: page 51, last paragraph).

b) In that respect, according to established case law (Case Law, *supra*, I.D.4.3.2; see in particular T 35/85: section 4 of the reasons, and T 197/86, OJ EPO 1989, 371: section 6.1.3 of the reasons), it is accepted that the patent proprietor (here, the respondent) may discharge his onus of proof by voluntarily submitting comparative tests with newly prepared variants of the closest state of the art identifying 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 feature is thereby more clearly demonstrated. In that respect, if comparative tests are chosen to demonstrate an inventive step on the basis of an improved effect over a claimed area, care should nevertheless be taken that the nature of the comparison with the closest state of the art is such that the alleged advantage or effect is convincingly shown to have its origin in the distinguishing feature of the invention compared with the closest state of the art.

c) In the present case, comparative AAPE-2 used in the experimental data filed with letter of 26 October 2020 differs from the AAPE prepared in example 2 of D4 and constituting the closest prior art in that:

(1) a higher amount of terephthalic acid (i.e. polyfunctional aromatic acid) was used: 45 mol.% in example 2 of D4 vs. 50 mol.% in the comparative example;

(2) a different ratio of adipic acid and sebacic acids (i.e. aliphatic dicarboxylic acids i) and ii)) was used: **molar ratio i/ii of 50/50 in example 2 of D4 vs. 30/70 in the comparative example.**

In the Board's view, because of above difference (2), the comparative example relied upon by the respondent does not allow a fair comparison with the AAPE prepared in example 2 of D4, which constitutes the closest prior art. In particular, by using a ratio i/ii which is significantly different from the specific disclosure of the closest prior art, the comparative example cannot be held to constitute a variant lying closer to the invention which is suitable to show an advantageous effect attributable to the distinguishing feature "ratio i/ii" (which is equivalent to the specific amounts of i) and ii) as defined in claim 1 of the main request). In other words, the comparative example relied upon by the respondent is, in view of the ratio i/ii of 30/70 used, not representative of the disclosure of the closest prior art and the comparison made is not appropriate to conclude that any effect that would be shown to be achieved using a ratio i/ii of 52/48 as compared to 30/70 (operative claim 1 vs. variant of the closest prior art) would mandatorily be present when using a ratio i/ii of 52/48 as compared to 50/50 (operative claim 1 vs. closest prior art). In the circumstances of the present case, the Board in particular considers that the evidence on file does not allow to conclude that any advantageously effect

attributable to the distinguishing feature "ratio i/ii" was either shown or rendered credible for a ratio i/ii as low as 51/49, which is according to claim 1 of the main request and very close to the disclosure of 50/50 according to the closest prior art.

d) At the oral proceedings before the Board, the respondent argued that the skilled person would expect that the magnitude of the effect shown in the experimental data filed with letter of 26 October 2020 would be proportional to the extent of the difference in ratio i/ii, i.e. the larger the difference in ratio, the bigger the effects. Therefore, by extrapolation of the data filed with letter of 26 October 2020, the skilled person would expect that the effect shown therein would also be present, albeit at a lower degree, when using a ratio i/ii according to operative claim 1 and slightly above 50/50 according to example 2 of D4 (e.g. 51/49), so the respondent.

However, the Board agrees with the appellant that the argument of the respondent is, in the absence of any evidence, speculative. Considering that, according to established case law, each party bears the burden of proof for the facts it alleges (Case Law, *supra*, III.G. 5.1.1), the burden of proof in order to show that the subject-matter claimed provides an advantage over the closest prior art primarily resides on the respondent, which, for the reasons indicated above, is not considered to have been done in the present case.

2.3.6 In view of this, no effect can be acknowledged for distinguishing feature (b). It is worthwhile adding that the respondent did not argue that any of distinguishing features (c) to (e) provided a technical effect relevant for the formulation of the technical

problem, so that the only effect which has to be taken into account for the formulation of the technical problem is the one of feature (a) (see point 2.3.3, above).

2.3.7 In view of the above, the problem effectively solved over example 2 of D4 resides in the provision of a different type of blend with improved mechanical properties (see section 2.3.3 above).

2.4 Obviousness

2.4.1 The question remains to be answered if the skilled person, desiring to solve the problem identified above, would, in view of the closest prior art, possibly in combination with other prior art documents or with common general knowledge, have modified the disclosure of the closest prior art according to the distinguishing features (a) to (e) identified in section 2.2.6 above in such a way as to arrive at the claimed subject matter.

2.4.2 In that respect, it was undisputed that it belonged to common general knowledge that mechanical properties of an AAPE may be improved with a larger aromatic content and that amounts of terephthalic within the range of 48-70 mol.% as defined in operative claim 1 were within the ambit of D4 (see e.g. D4: claim 1, feature a2)). Therefore, increasing the amount of terephthalic acid of the AAPE according to example 2 of D4 from 45 mol.% to e.g. 48 mol.% (distinguishing feature (a) identified in section 2.2.6 above) in order to increase the mechanical properties is obvious. That conclusion is in particular true for the lower end of the range defined in operative claim 1, which requires a relatively small increase of that feature, namely from 45 to e.g.

48 mol.%.

2.4.3 Although AAPes comprising amounts of aliphatic dicarboxylic acids as defined for components i) and ii) of operative claim 1 are not specifically disclosed in D4, it was not disputed that such amounts were within the general disclosure of D4. Also the Board has no reason to deviate from that view (see e.g. D4: claim 2). However, since the Board arrived at the conclusion that the ratio i/ii was not related to any technical effect, selecting a specific ratio i/ii (which is equivalent to using specific amounts of each components i) and ii)) according to claim 1 of the main request constitutes an arbitrary measure according to the teaching of D4. In that regard, the established decisive principle governing the answer to the question as to what a person skilled in the art would have done depends on the result they wished to obtain (T 939/92, OJ EPO 1996, 309: point 2.5.3 of the reasons). In the present case, since the amounts of the two aliphatic dicarboxylic acids i) and ii) defined in claim 1 of the main request is not related to any effect, no suggestion or hint for these amounts in the prior art is needed in order to render the subject-matter claimed obvious. Rather, it is sufficient to show that said (missing) feature(s) constitute(s) an arbitrary selection within a host of available alternatives. In that regard, also the fact that D4 discloses that a higher amount of aliphatic dicarboxylic acid ii) as compared to aliphatic dicarboxylic acid i) can be preferred (D4: claim 3 and paragraph 14) is not sufficient to disregard using these components in amounts as defined in claim 1 of the main request since said feature is not related to any particular technical effect. In particular, in the absence of any technical effect related to the amounts of components i) and ii)



(or the ratio i/ii) and in view of the general disclosure of D4, it cannot be concluded that D4 teaches away from using amounts of components i) and ii) according to claim 1 of the main request. For that reason, distinguishing feature (b) identified in section 2.2.6 above is obvious.

- 2.4.4 Distinguishing feature (c) identified in section 2.2.6 above was not shown to be related to any particular technical effect. Considering that polymers of natural origin are embodied e.g. in claims 4 or 5 of D4, the selection of such a polymer is within the ambit of D4 and merely constitutes an arbitrary, i.e. obvious, selection within the teaching of D4.
- 2.4.5 Although the subject-matter according to claim 1 of the main request was found to further differ from the disclosure of the closest prior art in features (d) and (e) identified in above section 2.2.6, the respondent has neither shown, nor even argued that any technical effect was related to these features and/or that they would contribute in any manner to an inventive step. It was in particular not argued that said features were not according to the general teaching or disclosure of D4. Under these circumstances, also these features constitute arbitrary, non-inventive selections within the ambit of D4.
- 2.4.6 For these reasons, each of the distinguishing features (a) to (e) identified in above section 2.2.6 is obvious and does not contribute to an inventive step.
- 2.5 In view of the above, the subject-matter of claim 1 of the main request does not involve an inventive step when taking D4, in particular example 2 thereof, as the

closest prior art.

**Auxiliary request 1**

3. The subject-matter of claim 1 of auxiliary request 1 differs from the one of claim 1 of the main request in that the nature of the "polymer of natural origin" (B) was limited to specific components, including starch.
4. Inventive step
  - 4.1 It was not disputed by the appellant, in particular at the oral proceedings before the Board, that the amendment made in claim 1 of auxiliary request 1 (as compared to the main request) constituted an additional distinguishing feature over example 2 of D4. The Board has no reason to deviate from that view, in particular because it was not shown that D4 disclosed any of the specific polymers of natural origin now defined in operative claim 1 in the framework of the subject-matter being claimed therein. It was in particular undisputed at the oral proceedings before the Board that the disclosure of starch in paragraph 90 of D4 is only related to blends of the prior art.
  - 4.2 It further remained undisputed between the parties that no particular technical effect had been demonstrated to be achieved in relation to the so amended definition of component (B) of operative claim 1. Therefore, the objective technical problem solved over example 2 of D4 remains the same as the one identified above in respect of the main request, namely to provide a different type of blend with improved mechanical properties.
  - 4.3 Regarding the obviousness of the solution, it is derivable from the documents on file that the use of

starch in combination with AAPEs similar to the ones of D4 is usual in the art: see paragraph 9 of the patent in suit; D4: paragraph 90, first sentence; D5: claims 1, 2, 6, 7; D6: claim 1 and paragraphs 32-35; D7: claims 1, 3, 11 and page 9, lines 11-12 and last paragraph; D8: claims 1, 2, 4, 7 and page 14, penultimate paragraph; D11: example 5, as was put forward by the appellant (oral proceedings and letter of 6 December 2023: section VI.1, starting from the fifth paragraph on page 10). In this respect the respondent did not contest the appellant's view that the priority claimed by the patent in suit was not valid and that, as a consequence, D11 was a prior art document pursuant to Article 54(2) EPC. Under these circumstances and further following the same reasoning as for the main request (section 2.4 above), it is obvious to provide another blend with increased mechanical properties by adding e.g. starch to a composition according to claim 1 of the main request, which is obvious for the reasons outlined above.

a) At the oral proceedings before the Board, the respondent argued that the skilled person knew that there were three types of AAPE blends, namely binary blends of AAPE with either natural polymers or polymers of synthetic origin and ternary blends (AAPE with polymers of both kinds). Considering that D4 did not explicitly disclose polymers of natural origin as the ones now specified in operative claim 1, s/he would understand that the teaching of D4 was limited to blends of AAPEs with polymers of synthetic origin and would, thus, not consider adding a polymer of natural origin, such as starch. Such an addition would only be made with hindsight, which was not allowable, so the respondent. Reference was further made to the Case Law, *supra*, I.D.3.6 and decision T 439/92, according to

which the consequence of choosing a certain starting point (here: D4, considered by the respondent to be directed to blends not comprising polymers of natural origin, such as starch) governed the framework for the further development.

b) However, the Board does not share the respondent's view that the teaching of D4 is limited to blends not comprising polymers of natural origin such as starch, in particular in view of the open wording of claims 4 to 7 ("comprising") of D4, which cannot be seen to exclude the presence of any additional component(s) in the mixtures therein defined. It was further also not shown that D4 contained any explicit or implicit disclosure that excluded and/or taught away from the use of e.g. starch as an additional component of the biodegradable polyester blends disclosed therein. Therefore, the respondent's argument that the teaching of D4 did not encompass blends comprising polymers of natural origin such as the ones now specified in operative claim 1 is not persuasive. That conclusion is also valid for rejecting the respondent's argument relying on T 439/92 (since D4 does not exclude blends comprising a polymer of natural origin, such as starch).

c) It is further noted that the requirement in terms of the concentration of (A) - the AAPE - defined in claim 1 of auxiliary request 1 defines the *relative* amount of the AAPE (A) and of the polymer of natural origin (B) but does not limit in any manner their *absolute* amounts. Therefore, the addition of a relatively small quantity of e.g. starch as compared to the AAPE being used can already be sufficient to ensure that the "concentration of (A), with respect to (A+B), is > 40 % by weight".

d) For these reasons, the respondent's arguments are rejected.

4.4 In view of the above, the subject-matter of claim 1 of auxiliary request 1 does not involve an inventive step when taking D4, in particular example 2 thereof, as the closest prior art.

**Auxiliary requests 2 to 4**

5. As explicitly agreed by the respondent during the oral proceedings before the Board (minutes: page 2, last full paragraph), although the amendments made in claim 1 of each of auxiliary requests 2 to 4 effectively limit the scope of claim 1 of these requests (as compared to the one of either the main request or auxiliary request 1), they are not suitable to overcome the conclusion regarding inventive step over example 2 of D4 reached for claim 1 of the main request (auxiliary request 2) or for claim 1 of auxiliary request 1 (auxiliary requests 3 and 4). The Board is also satisfied that claim 1 of each of auxiliary requests 2 to 4 can only share the same fate as claim 1 of the higher ranked requests because:

- The amendment related to the definition of the polyfunctional aromatic acid made in claim 1 of auxiliary requests 2 to 4 does not constitute an additional distinguishing feature over example 2 of D4; and
- The amendment of the higher end of the range of the content of the aromatic acid(s) to "60 % by moles" instead of "70 % by moles" made in claim 1 of auxiliary request 4 does not affect the

reasoning outlined above in respect of inventive step, in particular regarding the obviousness of an increase of the amount of polyfunctional aromatic acid(s) of the AAPE according to the closest prior art (from 45 mol.% to e.g. 48 mol.% or slightly above) with the simultaneous use of amounts of aliphatic dicarboxylic acids i) and ii) as defined in operative claim 1 and within the ambit of D4 in order to improve the mechanical properties of a blend of such an AAPE with a polymer of natural origin such as starch.

#### **Auxiliary request 5**

6. The subject-matter of claim 1 of auxiliary request 5 differs from the one of claim 1 of auxiliary request 4 in that the higher end of the range of the content of the polyfunctional aromatic acid(s) was further reduced to "53 % by moles" (instead of "60 % by moles").
7. Inventive step
  - 7.1 At the oral proceedings before the Board, the respondent argued that the range of the content of the aromatic acid(s) was now closer to the value of 50 mol.% used in example 1 of the patent in suit. Also, the range so being defined was narrow and it was shown in the patent in suit that that range led to blends with a particularly favourable balance of mechanical properties and biodegradability (patent in suit: table 1 and paragraphs 143-144). In the absence of any pointer to the specific selection made, in particular of any disclosure in the prior art of an AAPE according to component (A) of claim 1 of auxiliary request 5, the subject-matter of said claim 1 was not obvious, so the

respondent.

7.2 However, although the range of the content of the aromatic acid(s) now defined in operative claim 1 is more limited than the one defined in claim 1 of any of the higher ranked requests, said range is still within the ambit of D4 and there is no evidence on file that said range has anything special with respect to content of the polyfunctional aromatic acid(s) outside of it. Therefore, the amendment made cannot affect the reasoning outlined above in respect of claim 1 of the higher ranked requests. In particular, there is no reason for the Board to deviate from the conclusion that it is obvious to increase the amount of polyfunctional aromatic acid(s) of the AAPE according to the closest prior art (from 45 mol.% to e.g. 48 mol.% or slightly above) while at the same time using amounts of aliphatic dicarboxylic acids i) and ii) as defined in operative claim 1 and within the ambit of D4 in order to improve the mechanical properties of a blend of such an AAPE with a polymer of natural origin such as starch.

7.3 For these reasons, the subject-matter of claim 1 of auxiliary request 5 does not involve an inventive step when taking D4, in particular example 2 thereof, as the closest prior art.

#### **Auxiliary requests 6 to 9 - Admittance**

8. The appellant requested that auxiliary requests 6 to 9 be not admitted into the proceedings because they were late-filed and should have been filed already during the opposition proceedings.

- 8.1 In that respect, it was acknowledged by the respondent that these requests were indeed filed for the first time with their rejoinder (see in particular letter of 8 December 2023: page 5, penultimate paragraph). Therefore, the filing of these auxiliary requests constitutes an amendment to the respondent's case, whose admittance is subject to the Board's discretion pursuant to Article 12(4) to 12(6) RPBA.
- 8.2 The respondent further explained that these auxiliary requests were filed in reaction to the objection put forward in point V.3.2 of the statement of grounds of appeal, which had been raised for the first time by the opponent in their submission made at the very end of the deadline set by the opposition division for making submissions in preparation of the oral proceedings of November 11, 2021 (respondent's letter of 8 December 2023: page 5, penultimate paragraph). Therefore, the patentee would only have had the opportunity to file these auxiliary requests during the oral proceedings before the opposition division in the hypothetical case that the new objections were found persuasive, which was not the case since their main request was eventually allowed. Under these circumstances, the opportunity to file auxiliary requests 6 to 9 during the first instance proceedings did not arise and they were filed at the first opportunity in appeal, so the respondent.
- 8.3 In that respect, the Board is satisfied that, in view of the file history, the respondent's line of arguments is a fair reflection of the course of the first instance proceedings. Therefore, although it is correct that auxiliary requests 6 to 9 *could* have been filed during the opposition proceedings e.g. within the two-months period between the filing of the opponent's



submission of 11 November 2021 and the date of the oral proceedings (held on 14 January 2022) or even at the beginning of the oral proceedings (as a measure of precaution), the Board considers that, in the circumstances of the present case, it cannot be concluded that these requests *should* have been filed earlier. For that reason, it is not appropriate to disregard any of auxiliary requests 6 to 9 pursuant to Article 12(6) RPBA.

- 8.4 It is further taken into account that the objection raised in point V.3.2 of the statement of grounds of appeal mentioned by the respondent was effectively put forward, at least in such details, in their last written submission before the oral proceedings before the opposition division. Since the preliminary opinion of the opposition division was positive for the respondent, in the sense that all objections raised against their main request were - provisionally - rejected, the respondent had no reason to file any of auxiliary requests 6 to 9 before they received the submission of the opponent dated 12 November 2021. The same is valid regarding the course of the oral proceedings before the opposition division: since the main request of the patent proprietor was allowed, there was no reason for them to file any of auxiliary requests 6 to 9 during these oral proceedings. Under these circumstances, the Board cannot identify a deliberate abuse of the procedure on the side of the respondent which would be detrimental to the procedural economy. Rather, the Board considers that the filing of auxiliary requests 6 to 9 at the outset of the appeal proceedings is the result of normal developments in the opposition appeal proceedings.

8.5 In addition, the Board is satisfied that the respondent at least provided some explanation why the amendments of each of auxiliary requests 6 to 9 were made (rejoinder: page 2, penultimate paragraph to middle of page 4). In that respect, the Board further considers that the amendments made are relatively straightforward and that it is easily understandable that they were made in order to bring the subject-matter being claimed closer to the (sole) example of the patent in suit and further away from the disclosures of the various prior art documents relied upon by the appellant, as argued by the respondent (rejoinder: top of page 4). Therefore, it is evident that the amendments were made to address the objections of lack of sufficiency and lack of inventive step related to the broadness of the claims that were put forward in the statement of grounds of appeal. Also, it is noted that the respondent was, at this stage of the proceedings, still confronted with many objections, in particular pursuant to Article 100(b) EPC and Article 100(a) EPC together with Article 56 EPC (objections starting from five different documents as the closest prior art) and that, as indicated above, it was understandable from their written submissions why the amendments made in auxiliary requests 6 to 9 were intended to address all these objections. Under these circumstances, the Board is satisfied that the amendments made are not complex and constitute a *bona fide* reaction to the objections made. Finally, it is also taken into account that the amendments made were not shown to lead to a substantial change of the case which was such as to put the appellant at a disadvantage (no "fresh case" for the respondent).

8.6 At the oral proceedings before the Board, the appellant further argued that at no stage during the opposition

proceedings or even during the written phase of the appeal proceedings the respondent had explained how the amendments made in any of auxiliary requests 6 to 9 would overcome an objection that would be retained by the Board against any of the higher ranked requests, in particular the objection of lack of inventive step based on example 2 of D4. Therefore, the first time such a motivation would be put forward would be at the oral proceedings before the Board. According to established case law, this meant that the effective date of filing of these auxiliary requests was the date of the oral proceedings. Therefore, auxiliary requests 6 to 9 should be not admitted also in view of their effective date of filing, at the very end of the appeal proceedings, so the appellant.

However, as already indicated in section 8.5 above, the Board is satisfied that at least some substantiation in support of claim 1 of each of auxiliary requests 6 to 9 was provided by the respondent in their rejoinder and that it was understandable therefrom why the amendments were made. For these reasons, the Board considers that it would neither be appropriate to disregard auxiliary requests 6 to 9 in virtue of Article 12(5) RPBA, nor to consider that these auxiliary requests were first substantiated, and therefore filed, at the oral proceedings before the Board. For these reasons, the appellant's objection did not convince.

8.7 The appellant additionally argued that auxiliary requests 7 to 9 further introduced new deficiencies under Article 123(2) EPC and should, also for that reason, be not admitted.

However, as explained above, the Board is satisfied that auxiliary requests 7 to 9 constitute a *bona fide*

reaction of the respondent. Whether or not claim 1 of any of auxiliary requests 7 to 9 effectively introduce new deficiencies under Article 123(2) EPC can, in the Board's view, only be determined after a detailed analysis of the case, which in the present case can only be made if these auxiliary requests are indeed admitted into the proceedings. For that reason, the appellant's argument did not convince.

- 8.8 In view of the above, the Board found it appropriate to make use of its discretion to decide to admit auxiliary requests 6 to 9 into the proceedings pursuant to Article 12(4) RPBA.

**Auxiliary request 6**

9. Amendments made

The subject-matter of claim 1 of auxiliary request 6 differs from the one of claim 1 of auxiliary request 5 in that:

- (a) the diol is limited to 1,4-butanediol;
- (b) the lower end of the range of the content of the polyfunctional aromatic acid(s) is increased to "49 % by moles" (instead of "48 % by moles");
- (c) the higher end of the range of the content of the aliphatic dicarboxylic acid i) is limited to "70 % by moles" (instead of "95 % by moles");
- (d) the lower end of the range of the content of the aliphatic dicarboxylic acid ii) is increased to "30 % by moles" (instead of "5 % by moles").

10. Inventive step

10.1 The amendment related to the definition of the diol made in claim 1 of auxiliary request 6 (feature (a) identified in section 9 above) does not constitute an additional distinguishing feature over example 2 of D4 and can therefore not contribute to an inventive step.

10.2 Although the other amendments made (features (b) to (d) identified in section 9 above) further limit the definition of the AAPE according to component (A) of claim 1 of auxiliary request 6 (as compared e.g. to the definition of that component in claim 1 of auxiliary request 5), they still relate to features which were already acknowledged as distinguishing ones for the previous requests and it was still not shown that the more limited amended ranges were associated with different technical effects.

10.3 Regarding amendment (b), the respondent argued that, as indicated in paragraph 3 of the patent in suit, the skilled person would expect that the biodegradability of conventional AAPEs would decrease if the aromatic acid content became higher than 48%. However, paragraph 3 of the patent in suit is explicitly directed to "currently marketed polyesters of this kind", i.e. biodegradable aliphatic-aromatic polyesters obtained starting from aliphatic diacids such as adipic acid, aromatic diacids such as terephthalic acid and aliphatic diols mentioned in the preceding paragraph 2 of the patent in suit. In addition, there is no evidence on file that the statement made in said paragraph 3 is effectively valid for example 2 of D4 (which was not shown to correspond to a "currently marketed polyester of this kind", whereby it is further even not clear whether paragraphs 2-3 of the patent in

suit are directed to AAPEs made from a mixture of aliphatic dicarboxylic acids as defined by components i) and ii) of operative claim 1). Therefore, in the absence of any evidence supporting the respondent's argument, it cannot be concluded that the skilled person would have been deterred from using amounts of aromatic acids of e.g. 49 mol.% in view of common general knowledge (as reflected by paragraph 3 of the patent in suit).

10.4 In view of the above, none of the amendments made was shown to affect the reasoning outlined above in respect of claim 1 of the higher ranked requests. In particular, there is no reason for the Board to deviate from the conclusion that it is obvious to increase the amount of polyfunctional aromatic acid(s) of the AAPE according to the closest prior art (from 45 mol.% to e.g. 49 mol.% or slightly above) while at the same time using amounts of aliphatic dicarboxylic acids i) and ii) as defined in operative claim 1 and within the ambit of D4 in order to improve the mechanical properties of a blend of such an AAPE with a polymer of natural origin such as starch.

10.5 For these reasons, the subject-matter of claim 1 of auxiliary request 6 does not involve an inventive step when taking D4, in particular example 2 thereof, as the closest prior art.

**Auxiliary requests 7 to 9**

11. Inventive step

11.1 As explicitly agreed by the respondent during the oral proceedings before the Board, although the amendments made in claim 1 of each of auxiliary requests 7 to 9

effectively limit the scope of claim 1 of these requests (as compared to the one of auxiliary request 6), they are not suitable to overcome the conclusion reached regarding inventive step over example 2 of D4 for auxiliary request 6. In particular, no separate or additional arguments were put forward by the respondent for these auxiliary requests at the oral proceedings before the Board. The Board is also satisfied that claim 1 of each of auxiliary requests 7 to 9 can only share the same fate as claim 1 of auxiliary request 6 because:

- The amendment related to the definition of the polymer of natural origin (limitation to "starch and its derivatives") made in claim 1 of each of auxiliary requests 7 to 9 was already taken into consideration in the part of the reasoning related to the obviousness of the solution for auxiliary request 6 and the preceding requests;
- The amendment related to the concentration of (A) and to the range of the MFI feature made in claim 1 of each of auxiliary requests 7 to 9 was not shown to be related to any specific effect. Therefore, there is no reason to deviate from the conclusion drawn for the higher ranked requests that these features are purely arbitrary and can, therefore, not contribute to an inventive step;
- The amendments related either to the definition of the polyfunctional aromatic acid of component (A) (claim 1 of auxiliary requests 8 and 9) and of the aliphatic dicarboxylic acids i) as adipic acid and ii) as sebacic acid (auxiliary request 9) constitute no additional distinguishing feature(s) over example 2 of D4 and can, therefore not

contribute to an inventive step.

11.2 For these reasons, the subject-matter of claim 1 of auxiliary requests 7 to 9 does not involve an inventive step when taking D4, in particular example 2 thereof, as the closest prior art.

12. Since none of the respondent's requests is allowable, the patent is to be revoked.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated