



Case Number : T 60/90 - 3.3.3

DECISION
of the Technical Board of Appeal 3.3.3
of 11 December 1992

Appellant : BASF Aktiengesellschaft, Ludwigshafen
(Opponent) -Patentabteilung - C6-
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Respondent : SUMITOMO CHEMICAL COMPANY, LIMITED
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Decision under appeal : Interlocutory decision of the Opposition Division
of the European Patent Office of 18 October 1989,
issued on 17 November 1989 concerning maintenance
of European patent No. 0 060 531 in amended
form.

Composition of the Board :

Chairman : F. Antony
Members : R. Young
F. Benussi

A		B		C	X
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File Number: T 60/90 - 3.3.3

Application No.: 82 102 011.2

Publication No.: 0 060 531

Title of invention: A process for producing an aromatic polyester composition

Classification: C08G 63/60

DECISION
of 11 December 1992

Applicant: SUMITOMO CHEMICAL COMPANY, LIMITED

Opponent: BASF Aktiengesellschaft, Ludwigshafen

Headword:

EPC Articles 56, 123(2)

Keyword: "Inventive step (affirmed) - diametrically opposed teaching in prior art"

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 060 531 in respect of European patent application No. 82 102 011.2 filed on 12 March 1982 and claiming priorities of:

16 March 1981 (JP 38308/81);

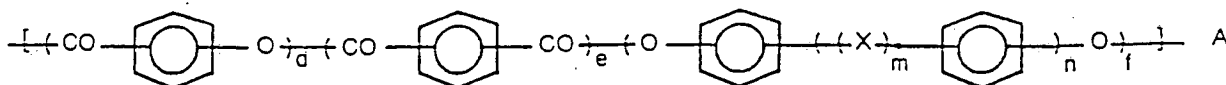
8 April 1981 (JP 53338/81);

4 August 1981 (JP 122861/81); and

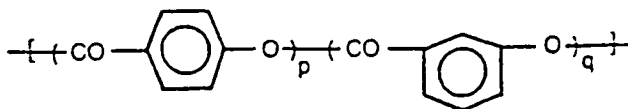
2 September 1981 (JP 138727/81) was announced on

2 January 1986 (cf. Bulletin 86/01). The only independent claim, Claim 1, read as follows (after correction of two printing errors):

" A process for producing an aromatic polyester composition, which is characterized in that, in producing by polycondensation an aromatic polyester represented by the general formula A,



(wherein X is an alkylene group having 1 to 4 carbon atoms, -O-, -SO₂-, -S-, or -CO-; m and n are each 0 or 1; the ratio of d to e is in the range of 1:1 to 10:1; the ratio of e to f is in the range of from 9:10 to 10:9; and the substituents attached to the benzene ring are in para or meta position to one another), the polymerization is carried out by the method of bulk polymerization, using substantially no solvent, and in the presence of at least one polymer selected from the group consisting of polyalkylene terephthalates, polyphenylene sulfides, aromatic polysulfones, and aromatic polyesters represented by the general formula B,



B

wherein (p+q) is in the range from 10 to 1,000 and p/(p+q)≥0.8."

II. Notice of Opposition was filed on 20 September 1986, on the grounds of Article 100(a) and (b) EPC.

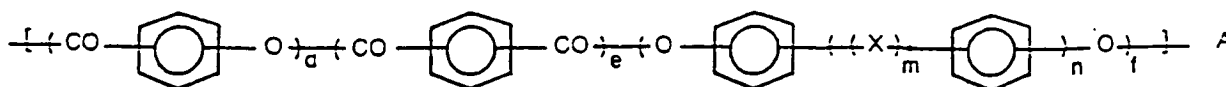
The Opposition was supported by the document

(D1) US-A-3 890 256.

III. After repeated amendments to the claims, a decision was given orally on 18 October 1989, and issued in writing on 17 November 1989, in which the Opposition Division held that the patent could be maintained in amended form on the basis of revised Claims 1 and 2 finalised at the oral proceedings.

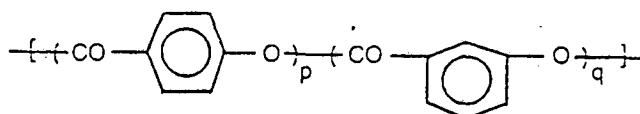
IV. Claim 1 reads as follows:

"A process for producing an aromatic polyester composition, which is characterized in that in producing by polycondensation an aromatic polyester represented by the general formula A,



(wherein X is an alkylene group having 1 to 4 carbon atoms, -O-, -SO₂-, -S-, or -CO-; m and n are each 0 or 1; the ratio of d to e is in the range of from 1:1 to 10:1; the ratio of e to f is in the range of from 9:10 to 10:9;

and the substituents attached to the benzene ring are in para or meta position to one another), the polymerization is carried out by the method of bulk polymerization, using substantially no solvent, and in the presence of at least one polymer selected from the group consisting of polyalkylene terephthalates, in the amount of 5 to 20% by weight based on the theoretically obtainable amount of the composition ultimately produced, polyphenylene sulfides in the amount of 5 to 30% by weight based on the theoretically obtainable amount of the composition ultimately produced, aromatic polysulfones in the amount of 5 to 40% by weight based on the theoretically obtainable amount of the composition ultimately produced, and aromatic polyesters represented by the general formula B,



B

wherein (p+q) is in the range of from 10 to 1,000 and $p/(p+q) \geq 0.8$, in the amount of 5 to 50% by weight based on the theoretically obtainable amount of the composition ultimately produced, in that way that all of the compounds to compose the aromatic polyester of the general formula A together with the polymer to be present in the polymerization system are charged at a time into a reactor, the charged mixture is then allowed to react at a temperature at which the polymer to be present in the polymerization system does not decompose, i.e. first at up to 250°C, then at 250° to 380°C, under atmospheric or reduced pressure and in an inert gas atmosphere in the presence or absence of a catalyst, the polymerization being proceeded, if desired, by continuously applying shearing, until substantially the whole polymerization

system has turned into the solid phase comprising polydispersed solid polymer."

According to the decision, (a) the amendments were allowable and the claims as a whole satisfied Articles 123(2) and (3) EPC (see points 7, 8 of reasons); (b) novelty in the light of D1 was no longer disputed; and (c) the cited document did not give any hints to solve the problem which was to be solved by the impugned patent.

V. On 17 January 1990 a Notice of Appeal against the above decision was filed, together with payment of the prescribed fee.

In the Grounds of Appeal filed on 16 March 1990, the Appellant (Opponent) argued that:

- (a) the amendment (i) "based on the theoretically obtainable amount of the aromatic polyester ultimately produced" instead of "based on the resulting composition" although materially correct, was contrary to Article 123(2) EPC because there was no basis for it in the original documents;
- (b) the amendment (ii) "i.e. first at up to 250°C" instead of "i.e. first at 180-250°C" was unclear and also contrary to Article 123(2), since it omitted an essential feature of the claimed process;
- (c) since novelty resided solely in the amount of the added polyethyleneterephthalate (hereinafter abbreviated PET), the remaining conditions being identical with those disclosed in D1, it would have been obvious to lower the amount of PET added from the 32 wt% disclosed in D1 to the maximum of 20 wt%

claimed, since the skilled person was well aware that the heat resistance of the aromatic polyester composition would be thereby increased; consequently, the subject-matter of Claim 1 was obvious.

VI. The Respondent (Patentee) on the other hand argued that:

- (a) the amendment (i) was clearly supported by unambiguous calculations based on the examples, had only been made in response to the Appellant's objection, and was allowable as a clarification (cf. submissions of 6 August 1990, pages 1, 2, in conjunction with those of 8 July 1987, pages 14, 15);
- (b) the functional requirement for "reaction" on the one hand and for the added polymer not to be decomposed on the other rendered the broadened range of amendment (ii) clear when read by the skilled person;
- (c) the claimed process was in any case completely different from that disclosed in D1, since the latter contained an essential first step in which the PET was "fragmented", the molecular weight of the resulting product then being increased only in a second step, whereas the patent in suit provided a one step polymerisation in which the added polymer, e.g. PET, was in contrast maintained essentially unchanged; furthermore the polymers covered by Claim 1 and exemplified in the patent in suit were distinct from those taught by D1 (cf. submission of 6 August 1990, page 6, read in conjunction with that of 8 July 1987, pages 5 to 13).

The Respondent filed a further set of claims omitting amendment (ii) as an auxiliary request (cf. submission dated 6 August 1990, page 4).

- VII. The Appellant requests the revocation of the patent in its entirety. With a letter dated 24 July 1992, an auxiliary request for oral proceedings was replaced by a request for a decision on the state of the file.

The Respondent requests maintenance of the patent either in the form as upheld in the interlocutory decision by the Opposition Division (main request) or in the form of the claims version of the auxiliary request. Alternatively, he requests oral proceedings.

Reasons for the Decision

1. The appeal is admissible.
2. Amendments
 - 2.1 Claim 1 is supported, as to the values of the percentages given of the various polymers to be present during polymerisation, by Claims 2 to 5 as filed.
 - 2.2 With regard to the basis of these percentages, the amendment (i) of the phrase "based on the aromatic polyester composition ultimately produced" in the original Claims 2 to 5 to read "based on the theoretically obtainable amount of the composition ultimately produced" in present Claim 1 is supported by the original disclosure in view of the calculations provided by the Respondent (cf. submission dated 8 July 1987, paragraph 5.2). According to these calculations, whose correctness is admitted by the Appellant (cf.

submission dated 30 July 1987, paragraph 4), the stated percentage in which the amounts of the polymer to be present during polycondensation are added in the examples always corresponds exactly to the percentage to be expected taking into account the cleaving off of the low molecular parts, i.e. it is based on the amount of polymer composition theoretically obtainable, rather than that actually obtained.

Thus the skilled reader can directly derive, from the unambiguous results of the admittedly correct calculations referred to above, that the original phrase "based on the aromatic polyester composition ultimately produced" must have meant "based on the theoretically obtainable amount of the composition ultimately produced". The inherent meaning of the original remains unchanged.

2.3 The concluding functional phrase in Claim 1, reading from "in that way that all of the compounds to compose the aromatic polyester of the general formula A, together with the polymer to be present in the polymerization system are charged at a time into a reactor, the charged mixture is then allowed to react at a temperature at which the polymer to be present in the polymerization system does not decompose, i.e. first at up to 250°C, then" to the end of the claim, is derivable from the original description on page 11, line 4 to page 12, line 8, subject to the obvious correction that instead of "B", "A" is meant on page 11, line 8.

2.3.1 In particular, the reference in this phrase to "a temperature at which the polymer to be used does not decompose" is, in the opinion of the Board, supported by the sentence "The highest allowable temperature depends partly upon the boiling or decomposition temperature of

the monomer, oligomer or polymer which was used." (see original description, page 11, lines 23 to 25).

While it is true that this sentence does not itself make explicit reference to the polymer in the presence of which the polymerisation reaction is to be carried out, it is manifestly clear that the "polymer which was used" cannot be the final product, since this is not present until the reaction is complete. Rather, the reference must be to one of the ingredients. In this connection, the explicit reference to "the polymer used according to this invention to be present in the polymerization system producing an aromatic polyester" (cf. original page 6, lines 12 to 14) unambiguously establishes the contextual identity of "thepolymer used" as "the polymer to be present in the polymerization system".

It is in any case clear that the polymeric component "to be present" cannot be allowed to decompose since it is the intention to incorporate it into the final aromatic polyester composition (cf. patent in suit, page 3, lines 49 to 50; page 4, lines 64 to 65).

Thus "the polymer which was used" must inevitably be understood by the skilled person as meaning "the polymer to be present in the polymerization system producing an aromatic polyester".

- 2.3.2 The above functional phrase also includes amendment (ii), "first at up to 250°C", which is supported by the phrase "first at a comparatively low temperature of 180° to 250°C" in the original description (page 11, lines 25 to 27). The deletion of the lower limit of the range "180° to 250°C" was effected to resolve an alleged inconsistency with the examples (cf. decision under appeal, point 7 of reasons).

The assertion of the Appellant that the deleted feature corresponded to an essential feature (see Grounds of Appeal, page 3, first paragraph) cannot be accepted. The deleted feature meets the threefold criteria set out in the decision T 331/87 of 6 July 1989 (OJ EPO 1991, 22; see point 6 of the reasons). Thus the feature in question was (1) not explained as essential in the disclosure (it was originally a preferred embodiment); (2) it was not, as such, essential for the function of the invention (the examples used a lower temperature: the source of the contradiction) and (3) the removal required no real modification of other features to compensate for the change. Resolving an inconsistency by such a form of amendment was also found unobjectionable under Article 123(2) EPC in the earlier decision T 2/80 of 5 June 1981 (OJ EPO 1981, 431).

- 2.3.2.1 The objection that the absence of a lower limit results in lack of clarity (cf. Grounds of Appeal, paragraph 2.II) is unconvincing, since the skilled person will be aware that the technique of bulk polycondensation should not be carried out at a temperature so low that no reaction can take place.
- 2.3.2.2 The fact that the amended range is broader than the unamended range has no consequences for Article 123(3) EPC because neither range was present in Claim 1 as granted.
- 2.4 Present Claim 2 corresponds to Claim 6 as originally filed.

In summary, there are no formal objections under Article 123(2) and (3) EPC to the claims of the main

request since they are supported by the original disclosure and do not extend the protection conferred.

3. Closest State of the Art

3.1 The patent in suit is concerned with the production of aromatic polyester compositions. The desirable properties of wholly aromatic polyesters, including those of thermal resistance and dimensional stability are known, but owing to their high softening points and high melt viscosities they are difficultly mouldable and moreover have a tendency to become orientated upon injection moulding, resulting in directional inequality of shrinkage, referred to as mould shrinkage anisotropy (cf. patent, page 2, first two paragraphs).

3.1.1 It is known inter alia to introduce a more flexible aliphatic unit such as a segment of ethylene glycol into a rigid main chain of the aromatic polyester for the purpose of imparting appropriate melt flowability, though this is accompanied by a decline of the excellent characteristics of aromatic polyesters, especially thermal resistance (cf. patent in suit, page 2, lines 44 to 49).

3.1.2 Another approach consists in blending the aromatic polyester with a more easily flowable (more easily mouldable) resin such as, for example, PET. However, if the subsequent processing is carried out at temperatures sufficiently high for obtaining a homogeneous product, the PET tends to undergo thermal decomposition. If, on the other hand, the blend is processed at temperatures sufficiently low to keep the PET from decomposition, the whole mixture will not form a uniformly dispersed mass (cf. patent in suit, page 2, lines 19 to 31).

3.2 The document D1, which is the sole state of the art cited by the Appellant in these proceedings, relates to a process of the former type, for providing an injection mouldable copolyester of high flexural modulus, high tensile strength and high impact strength which can be used without reinforcement as a substitute for stronger materials, such as ceramics and metals (column 1, lines 6 to 27).

3.2.1 According to D1 the copolyester has no substantial amounts of either aliphatic to aromatic oxygen linkages or aromatic to aromatic oxygen linkages and is prepared by a process comprised of two steps.

The first step comprises preparing a "fragmented polyester" by contacting an acyloxy benzoic acid with a starting polyester derived from a dicarboxylic acid and ethylene glycol and having an inherent viscosity of at least about 0.2, in the presence of a quantity of aromatic dicarboxylic acid and an aromatic diol. Upon contact, the starting polyester and acyloxy benzoic acid react by acidolysis to form the fragmented polyester (column 6, lines 33 to 49).

The second step comprises increasing the inherent viscosity of the "fragmented polyester" to form a copolyester comprised of various kinds of divalent radicals, including: (B), the divalent radical remaining after removal of the hydrogen atoms from the ethylene glycol, which comes from the ethylene glycol portion of the starting polyester; (C), the divalent radical remaining after removal of the acyl and hydroxy groups from the acyloxy benzoic acid, which comes from the acyloxy benzoic acid, and (D), which comes from aromatic diol that is present when the starting polyester is

contacted with the acyloxy benzoic acid (cf. column 1, lines 34 to 36; column 6, line 51 to column 7, line 3).

3.2.2 Radicals (C) plus (D) amount to 30 to 75 mole percent, and radical (D) to not more than 30 mole percent, based on the total moles of radicals (B), (C) and (D) (cf. column 5, line 67 to column 6, line 5). As shown in the graphs of the relevant Figures 2 and 3, copolyesters within this range of composition have a tensile strength of at least 12,000 psi (840 kg/cm²) and an impact strength (notched) of at least 1.2 ft -lb/in (6.5 kg cm/cm).

3.2.3 According to Example I (the only worked example), in accordance with the first step, a fragmented polyester is prepared by placing the following components into a flask:

0.2 moles PET, containing conventional zinc/antimony catalyst and having an I.V. (intrinsic viscosity) of about 0.60,
0.15 moles 4-acetoxybenzoic acid,
0.15 moles terephthalic acid, and
0.15 moles hydroquinone diacetate.

The flask is fitted with a stirrer and condensate take-off and immersed into a thermostated Wood's metal bath at 150°C. The temperature is raised to 270°C. over a period of approximately 20 minutes. After approximately 5 minutes at 270°C., the reaction starts and acetic acid is taken off. After approximately 290 minutes at 270°C. the temperature is raised to 290°C. and the reaction continues for approximately 30 minutes.

In accordance with the second step of increasing the inherent viscosity of the fragmented polyester, a vacuum

is then applied at approximately 0.10 mm for 2 hours 10 minutes and polycondensation products are removed overhead. The resultant copolyester has an I.V. of 0.70 (see column 11, lines 30 to 67).

- 3.3 The remaining documents in the proceedings are merely extracts from standard works cited by the Respondent and concerned with ester exchange in polycondensation reactions with no further relevance to the subject-matter under consideration.

4. The Technical Problem and its Solution

Although under these circumstances it might appear that D1 by default must be regarded as the closest state of the art for the purposes of establishing the technical problem objectively arising, no experimental data are available to the Board which could provide an objective insight into the nature of the reactions in D1, let alone a direct, specific comparison with the claimed subject-matter.

On the other hand, it is clear from the introduction of the patent itself that other relevant avenues have been explored in the past, in particular that of physical blending (cf. section 3.1.2 above). For instance, PET may be granulated with a ready formed aromatic polyester conforming to general formula A and injection moulded. The fact that this is indeed prior art is not in dispute. Since this latter approach is the subject of comparative tests in the patent in suit, and in spite of the fact that D1 is the only document cited by the Appellant in the sense of Article 54(2) EPC, the establishment of the technical problem will be approached from both standpoints.

4.1 Starting from D1 as closest state of the art:

4.1.1 The patent in suit identifies a deficiency in the area of thermal stability for products of a process of the D1 type (see patent, page 2, lines 47 to 49). This is indeed consistent with the complete silence of D1 as to the thermal resistance properties of the copolyesters disclosed therein, and is moreover indirectly confirmed by the argument of the Appellant that it would be immediately obvious to try to improve the heat distortion stability of the products in D1 (see Grounds of Appeal, paragraph III.2).

4.1.2 Compared with the state of the art according to D1, the technical problem could thus be seen in the provision of an aromatic polyester composition having improved thermal resistance whilst retaining good mechanical qualities such as tensile strength and impact strength.

4.1.3 The solution according to the patent in suit was to replace the first step of preparing a "fragmented" polyester and the second step of increasing the inherent viscosity of the fragmented polyester, by a single step polycondensation carried out under bulk conditions (i.e. in the substantial absence of solvent) to produce an aromatic polyester represented by the general formula A (see paragraph IV above), the bulk polycondensation being carried out in the presence of at least one polymer selected from polyalkylene terephthalates, polyphenylene sulphides, aromatic polysulphones, and polyesters of general formula B, in specific amounts based on the theoretically obtainable amount of the composition ultimately produced, the specific amount in the case of a polyalkylene terephthalate being 5 to 20 percent by weight.

- 4.1.4 It is clear from the relevant examples of the patent in suit (i.e. Examples 1 to 3 in which the added polymer is PET), that the tensile strength of around 1100-1200 kg/cm² and impact strength (notched) of around 8 to 9 kg cm/cm (cf. patent, Tables 1, 2, 3) of the polymers produced, are comparable with the values given for the corresponding parameters in the products of D1 (cf. section 3.2.2 above), and that thermal decomposition burn marks are absent from the moulded products according to the patent in suit.

Thus the claimed measures evidently provide a credible solution of the technical problem arising in relation to D1. No evidence to the contrary has been supplied by the Appellant who, being the Opponent, had the burden of proof with regard to material introduced for the first time by him at the opposition stage.

- 4.2 Alternatively, starting from "physical blending" as closest state of the art:

- 4.2.1 In the case where the added polymer is physically blended with the already formed aromatic polyester of general formula A, then the technical problem could be seen as that of providing an aromatic polyester composition having improved mouldability and reduced mould shrinkage anisotropy, without loss of the desirable mechanical and thermal stability properties of aromatic polyesters.

- 4.2.2 The solution of this problem according to the patent in suit is that of replacing the physical blending step by that of carrying out the bulk polymerisation by which the aromatic polyester of the general formula A is to be formed, in the presence of the added polymer (e.g. PET).

- 4.2.3 It can be seen from the examples and comparative examples of the patent in suit, especially the relevant Examples 1 to 3 and Comparative Example 2 in which the added polymer is PET, that the claimed measures result in improved mouldability (i.e. a wider range of moulding temperature) and reduced orientation, together with maintenance of tensile and impact properties and absence of thermal decomposition burn marks in the polymers produced (see Tables 1, 2, 3).

Consequently this technical problem is also credibly solved.

- 4.3 The objection of the Appellant under Article 100(b) EPC that the skilled person would not be able to determine the amounts of the polymer to be added when these were "based on the aromatic polyester ultimately produced" (Grounds of Opposition, paragraph 4) is overcome by the amendment (i) above, since it has been made clear that the amounts can be theoretically calculated.

5. Novelty

It has been admitted by the Appellant, that the weight percentage of starting polyester in the example of D1, calculated to be 32%, falls outside the range of 5 to 20% for this parameter permitted by Claim 1 of the patent in suit insofar as reaction in the presence of PET is envisaged. Novelty is therefore given in this respect (Grounds of Appeal, paragraph III.1). The other polymers in whose presence the polymerisation may be carried out, viz. polyphenylene sulphides, aromatic polysulphones, and polyesters of general formula B, are not mentioned in D1. The subject-matter claimed in the patent in suit is thus novel.

6. Inventive Step

Two distinct disclosures having been considered in turn as closest state of the art, resulting in the establishment of two different objective technical problems and their solutions, it is necessary to investigate the issue of inventive step separately in relation to each.

6.1 In the first case, i.e. starting out from D1 as closest state of the art, it is necessary to consider whether the skilled person would have made the combined modifications of section 4.1.3 above in the expectation of achieving improved thermal resistance in the resulting polymer composition.

6.1.1 This question must be answered in the negative. Although the products according to D1 are stated to be injection mouldable (column 11, lines 7 to 25), there is no hint as to how their thermal resistance might be improved.

6.1.2 The argument of the Appellant according to which the skilled person would in any case have reduced the amount of added PET in D1 from the disclosed 32% by weight to the claimed maximum of 20% by weight, in order to improve the heat distortion resistance (see Grounds of Appeal, paragraph III.2) is unconvincing, because the teaching of D1 itself sets limits on the proportions of the various monomers and thus indirectly on the amount of PET added (cf. paragraph 3.2.2 above). It has in this connection been shown by the Respondent by means of molecular weight calculations, that copolyesters having the ratios of radicals $(C)+(D)/(B)+(C)+(D)$ and $(D)/(B)+(C)+(D)$ prescribed in D1 cannot correspond to polymers produced by a process covered by Claim 1 of the patent in suit (see submission of 8 July 1987, pages 6 to 12). The

accuracy and pertinence of these calculations have not been challenged by the Appellant. On the other hand it is the teaching of D1 that the desirable mechanical properties (tensile and impact strength; flexural modulus) are dependent on these proportions being respected.

Consequently, if the skilled person had decided to lower the amount of PET added, one of two situations would necessarily have arisen: (i) had the lowered amount of PET still been such as to fulfil the proportions of the monomers B, C, D taught by D1, the result would have been something different from any polymer that could be produced according to the patent in suit; (ii) had the reduction in the proportion of PET been greater, so that the amount of PET added now fell within the percentage limits given in Claim 1 of the patent in suit, this would be in direct contradiction to the teaching of D1 as to the proportions of the respective monomers in the copolyester, with the loss presumably of the desirable mechanical properties associated with the proportions taught therein.

- 6.1.3 Notwithstanding the above, the argument of similarity between the examples of the patent in suit and those of D1 (see submission dated 15 March 1988) neglects firstly the differences in starting materials and concentrations between the examples of D1 and the patent in suit, including the use of pre-esterified ingredients in the former but not the latter, and secondly the presence of a "conventional zinc/antimony catalyst", i.e. a transesterification catalyst, in the prior art reaction.

Thus despite their somewhat similar temperature profiles, the presence of the above substantial differences means that there is no compelling evidence that the course of

the reactions in each case must have been identical, although the onus was on the Appellant to prove this (see section 4.1.4 above). It cannot therefore be concluded that D1 disclosed a process which, apart from the amount of PET added, was identical with that claimed in the patent in suit.

- 6.1.4 It must be recalled in this connection that it is an indispensable preliminary step in D1 to "fragment" the polyester, before increasing the molecular weight of the subsequently formed copolyester. Although no quantitative information as to the degree of this fragmentation is given in D1, it is clear that individual units from the starting polyester are required as building units for the subsequent copolyester (cf. definition of radical (B); column 6, lines 59 to 63).

In the patent in suit on the other hand, it is the intention to incorporate the added polymer (e.g. PET) in microdispersed, i.e. substantially unchanged, form in the aromatic polyester (cf. page 3, lines 48 to 50; page 4, lines 64 to 65).

- 6.1.5 The argument of the Appellant that some modification of the polymer "in the presence" of which the reaction is carried out in the patent in suit was also not excluded, on the basis of the reference to "partial copolymerisation" in the latter (page 3, lines 49 to 50), is beside the point, since "partial copolymerisation" is to all intents and purposes the reverse phenomenon to "fragmentation".

In summary therefore, even if the skilled person were to have reduced the quantity of PET added in D1, contrary to the teaching of that document, and regardless of the concomitant risk of loss of the mechanical properties

aimed at, into the range comprehended by the terms of Claim 1 of the patent in suit, the resulting process would still not have corresponded to anything falling within the terms of the latter, since the progress of the reaction in D1 has not been shown to be otherwise identical with that of the patent in suit, and, in particular, the requirement in D1 for initial fragmentation of the added polymer means that the characterising feature of the bulk polymerisation being carried out in the presence of the added polymer in the patent in suit would not have been fulfilled.

Indeed, the teaching of D1 is, in this crucial latter respect, diametrically opposed to that of the patent in suit. The solution of the technical problem cannot therefore be rendered obvious by it.

6.2 To assess the question of inventive step in the second case, i.e. starting out as if the disclosure of Comparative Example 2 were the closest state of the art, it is necessary to consider whether the skilled person would have made the modification of paragraph 4.2.2 above in the expectation of achieving improved mouldability and reduced mould shrinkage anisotropy in the resulting polymer composition without loss of the other desirable mechanical and thermal properties of aromatic polyesters.

6.2.1 This question must also be answered in the negative. There is no teaching in the Comparative Example taken by itself to do anything but what is disclosed therein. Furthermore, no assistance is to be obtained even when considering the teaching of D1 in combination with this disclosure. Firstly, there is no pointer in D1 as to how the mouldability of the copolyesters might be further improved, nor any reference to mould shrinkage anisotropy

at all, let alone any way of improving the latter. Secondly, the teaching of D1 requires the preliminary preparation of a "fragmented" polyester, which, as pointed out in section 6.1.5 above, is directly contrary to the measures characterising the solution of the technical problem posed.

Consequently, the skilled person wishing to improve these characteristics would not have had any hint from the teachings of the Comparative Example as to the modifications necessary for the solution of the technical problem, and had he relied on the procedures described in D1, would not have performed anything corresponding to the claimed process.

6.3 The remaining documents are, as pointed out above, more remote.

The subject-matter of Claim 1 of the patent in suit therefore cannot be regarded as arising in an obvious way from the teachings of the prior art, whether starting from D1 or from another acknowledged variant.

The subject-matter of Claim 1 therefore involves an inventive step. Since Claim 2 is dependent on Claim 1, it too by the same token is directed to subject-matter which is both novel and inventive.

7. In view of this finding, it was not necessary either to consider the claims forming the auxiliary request of the Respondent or to appoint oral proceedings.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

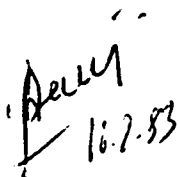

E. Görgmeier

The Chairman:


F. Antony

00219


9.2.83


16.2.83