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File Number: T 755/90 - 3.3.3  
Application No.: 83 303 938.1  
Publication No.: 99 698  
Title of invention: Improved polyester fiber and method for the production thereof

Classification: D01F 6/84

DECISION  
of 1 September 1992

Proprietor of the patent: TORAY INDUSTRIES, INC.

Opponent: 01) Viscosuisse SA  
02) Hoechst AG

Headword:

EPC Articles 54(3), 56, 104(1), 111(1), 116(1); Rules 63(1) and 67

Keyword: "Novelty (yes) - additional parameter"  
"Inventive step (main request: no) - general technical problem not solved -solution of the limited technical problem not inventive"  
"Inventive step (auxiliary request: yes)"  
"Late-filed claims - abuse of procedure - apportionment of costs"  
"Request for further oral proceedings - rejected"  
"Request for reimbursement of appeal fee after withdrawal of appeal - rejected"



Case Number : T 755/90 - 3.3.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.3  
of 1 September 1992

**Appellant :**  
(Proprietor of the patent)

Toray Industries, Inc.  
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**Representative :**

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**Respondent 1 :**  
(Opponent 01)

Viscosuisse SA  
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**Respondent 2 :**  
(Opponent 02)

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**Decision under appeal :**

Interlocutory decision of the Opposition Division  
of the European Patent Office dated 30 July 1990  
concerning maintenance of European patent  
No. 99 698 in amended form.

**Composition of the Board :**

**Chairman :** F. Antony  
**Members :** C. Gérardin  
M. Aúz Castro

## Summary of Facts and Submissions

- I. The mention of the grant of the patent No. 99 698 in respect of European patent application No. 83 303 938.1 filed on 6 July 1983 and claiming the priority of 9 July 1982 from an earlier application in Japan, was published on 4 February 1987 on the basis of 12 claims, Claim 1 reading as follows:

"A polyester fiber having a tenacity of at least 4.0 g/d (about 0.04 N/dtex) which fibre comprises a copolyester having a degree of polymerization of from 80 to 100, the copolyester including an acid component and a glycol component, 1.0 to 2.0 mol percent of the said acid component being metal sulfoisophthalic residues, and 0.5 to 1.9 weight percent of the copolyester being glycol residues provided by a glycol having a molecular weight of from 400 to 6000."

Claims 2 to 7 were dependent claims directed to preferred polyester fibres according to the main claim. Further, Claims 8 to 12 concerned a method as well as preferred embodiments thereof for producing such a polyester fibre.

- II. On 31 October 1987 Opponent 1 filed a Notice of Opposition against the grant of the patent and requested revocation thereof in its entirety for lack of novelty and inventive step under Article 100(a) EPC; in addition, several objections falling under Article 84 EPC were raised.

On 5 November 1987 Opponent 2 lodged an opposition to the granted patent and requested revocation thereof in its entirety on all the grounds falling under Article 100 EPC.

These objections, which were emphasised and elaborated in several later submissions as well as during oral proceedings, were based essentially on the following documents:

- (1) US-A-3 018 272,
- (2) US-A-3 725 351,
- (3) US-A-3 772 872,
- (6) US-A-3 376 249,
- (17) WO 83/03432 (date of priority: 30 March 1982, designating DE, FR and GB), and
- (19) US-A-3 745 141.

III. By an interlocutory decision of 30 July 1990, the Opposition Division held that there were no grounds of opposition to the maintenance of the patent in amended form on the basis of a set of six claims corresponding to the then fourth auxiliary request, the main claim incorporating the feature of Claim 7 as granted - the polyester fibre comprising thus (a) a polyester according to Claim 1 as granted, and (b) from 0.1 to 4 weight percent, based on the weight of the fibre, of inorganic microfine particles having an average diameter of no more than 100 nm - and the dependent Claims 2 to 6 being maintained unamended.

It was stated in that decision that the combination of features according to (a) was disclosed in document (17) and that only the additional feature (b) conferred novelty within the meaning of Article 54(3) EPC to the claimed subject-matter, since the diameter of titanium dioxide particles was not specified in that citation. An inventive step was acknowledged as well since the subject-matter was regarded as an inventive selection invention within the teaching of document (2), which was regarded as the closest state of the art, and the other relevant

documents, namely (1), (3) and (6), did not disclose more than isolated features thereof.

- IV. On 24 September 1990 Opponent 1 filed a Notice of Appeal against that decision and paid the prescribed fee at the same time. No Statement of Grounds of Appeal was filed thereafter. That appeal was withdrawn by letter of 28 November 1990.
- V. The Patentee also filed a Notice of Appeal against that decision on 1 October 1990 and paid the prescribed fee on 2 October 1990. In the Statement of Grounds of Appeal filed on 6 December 1990 the Appellant argued in favour of the maintenance of the patent on the basis of Claims 1 to 7 as granted as main request. A first auxiliary request for the Contracting States DE, FR and GB was filed simultaneously.

Together with various statements submitted in the course of December 1991 several sets of claims to be considered as further auxiliary requests were filed successively.

During oral proceedings, which took place on 8 January 1992, the Appellant (Patentee) and the Respondents (Opponents) presented arguments in favour of and against the novelty and inventive step of the subject-matter as defined in Claim 1 of the main request and of the five auxiliary requests then before the Board.

- VI. When the parties were invited to present their final requests, however, the Appellant requested that the patent be maintained for the Contracting State IT on the basis of Claims 1 to 6 of the patent as granted, but filed as main request for the Contracting States DE, FR and GB a new set of Claims 1 to 6, wherein a new feature not considered hitherto had been incorporated into the main claim, the

latter now beginning to read: "A polyester fiber having a denier no more than 1.3 d (1.43 dtex) and having a tenacity ...". In addition, another set of Claims 1 to 6 to be considered as an auxiliary request for the Contracting States DE, FR and GB was submitted, of which Claim 1 reads as follows:

"A polyester fiber having a tenacity of at least 4.0g/d (about 0.04N/dtex) which fiber comprises

(a) a copolyester having a degree of polymerization of from 80 to 100, the copolyester including an acid component and a glycol component, 1.0 to 2.0 mol percent of the said acid component being metal sulphoisophthalate residues, and 0.5 to 1.9 weight percent of the copolyester being glycol residues provided by glycol having a molecular weight of from 400 to 6000, and

(b) from 0.1 to 4 weight percent, based on the weight of the fiber, of inorganic microfine particles having an average diameter of no more than 100 nm."

The Respondents thereafter declared that they were not in the position to discuss the merits of the above new feature which was not even the subject-matter of a dependent claim, but had been taken arbitrarily from the description. They regretted the fact that the oral proceedings had been misused and that this late request would only result in further unnecessary costs and waste of time, the case being probably remitted to the first instance for continuation of the opposition procedure on that new basis with the prospect of further oral proceedings before the Opposition Division, and possibly another appeal procedure, again with oral proceedings.

VII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained for the Contracting States DE, FR, GB on the basis of Claims 1 to

6 filed during oral proceedings as main request or on the basis of Claims 1 to 6 also filed during oral proceedings as subsidiary request, and for the Contracting State IT on the basis of Claims 1 to 6 as granted.

The Respondents requested that the appeal be dismissed.

After deliberation by the Board the Chairman announced that the decision under appeal was set aside, that the proceedings were to be continued in writing on the above basis, and that the Respondents were set a term of two months for comments if any.

VIII. In the statement filed on 4 March 1992 Respondent 1 argued that, regarding the set of claims for the Contracting States DE, FR and GB according to the main request, the additional feature of no more than 1.3 d (1.43 dtex) was nothing more than a desirable property which in practice was not achieved. Therefore, it was not consistent to combine that parameter with the other features in the wording of Claim 1. Moreover, the values thereof in the examples of the patent in suit were comparable with the data mentioned in several documents and could not, consequently, reflect an inventive step. Further, the subject-matter defined in the set of claims for the Contracting State IT was neither novel, Claim 2 being anticipated by document (2), nor inventive, Claim 1 being derived in an obvious manner from documents (1) and (2). As to the claims for the Contracting States DE, FR and GB according to the auxiliary request, the diameter of the particles of titanium dioxide could not be regarded as an inventive feature, since the addition of small particles to polyester filaments was well known in the art and document (17) itself mentioned the incorporation of the same amount of titanium dioxide.

Respondent 2 did not submit any written statement after the oral proceedings.

- IX. In its reply on 30 April 1992 the Appellant pointed out that, as far as the claims for the Contracting States DE, FR and GB according to the main request were concerned, Examples 8 to 10 of the patent in suit mentioned yarns having a count of 75 d (82 dtex)/72 filaments, namely fibres of 1.04 d (1.14 dtex); such figures were in line with the new requirement specified in Claim 1. That feature was essential to produce soft hand fabrics easily dyeable with cationic dyes; this was neither described, nor suggested in the documents relied upon by the Respondents. Regarding the claims for the Contracting State IT, an amount of glycol component as low as 1.9 wt % of total polyester was not to be found in document (2), regarded as the closest state of the art. Further, as far as the claims for the Contracting States DE, FR and GB according to the auxiliary request were concerned, even if it was known from various documents to incorporate titanium dioxide into a polyester yarn, that filler acted there as a delusterant, which required the particles to have an average diameter significantly higher than that of the microfine particles in the patent in suit; moreover, document (17) having been cited under Article 54(3) EPC, it could not form part of the state of the art when assessing the question of inventive step.
- X. Although in that submission the Appellant did not explicitly reiterate the requests presented at the end of oral proceedings, the arguments presented therein can only be interpreted as a maintenance of these requests (see point VII above). Further oral proceedings were requested should the Board of Appeal intend to refuse the main request for the Contracting States DE, FR and GB or the



request for the Contracting State IT, on a ground based on a document other than document (17).

Respondent 1 requested that the patent be revoked in its entirety for all the Contracting States and that the appeal fee paid by it be reimbursed.

Respondent 2 requested that the appeal be dismissed.

#### Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is admissible.

#### Procedural matters

2. During the oral proceedings, six different sets of claims were discussed, most of which were submitted about one month before the oral proceedings. At the end of the oral proceedings it had become clear to the Board that, of all the requests so far discussed, only one overcame the objections under Articles 54(3) and 56 EPC, viz. the present auxiliary request. The Board would have been ready for a decision in that sense.

At this point in time the Appellant submitted another main request incorporating an entirely different feature, viz. a denier of no more than 1.3 d, which request took the Respondents by complete surprise because nothing in the specification suggested that this could be an essential feature. Accordingly the Respondents were not in a position to present substantive arguments regarding the inventive contribution, if any, of the said added feature. The Board being equally surprised in this situation of uncertainty exercised its discretion in the sense of

admitting the said new main request into consideration; thus continuation of the proceedings in writing became necessary.

The Board considers the circumstances of the above-referred request to manifest so undesirable a conduct on the side of the Appellant that, even in the absence of a formal request for apportionment of costs from the side of the Respondents, such an apportionment is appropriate.

As provided in Rule 63(1) EPC, when an apportionment of costs is to be decided, only the expenses necessary to assure proper protection of the rights involved will be taken into consideration. In the present case, the expenses incurred by Respondent 1 subsequent to the oral proceedings comprise the preparation of the written submission filed on 4 March 1992. The Board has thus decided for reasons of equity to order an apportionment of costs by which the Appellant shall pay to Respondent 1 all the costs involved in the filing of the above statement.

3. The next issue to be decided is whether the Board should either exercise any power within the competence of the Opposition Division or remit the case to the Opposition Division for further prosecution (Article 111(1) EPC). It is at the Board's discretion whether it examines and decides the case or remits it to the first instance.

Having regard to the fact that, first, the Respondents have been given an opportunity to comment on the questions to be decided and the Appellant filed a reply on 30 April 1992 in reply to the written statement by Respondent 1 on 4 March 1992 (Article 113(1) EPC), secondly, that the patent application was filed more than nine years ago, and, thirdly, that an explicit request for remittal of the case to the first instance has not been formulated by any

of the parties, the Board has chosen to examine and decide the case itself.

4. This conclusion, however, raises the issue of the conditional request presented by the Appellant for further oral proceedings (see point X above), since, as will appear hereinafter, the main request for the Contracting States DE, FR and GB as well as the request for the Contracting State IT have to be rejected.

According to Article 116(1) EPC, second sentence, "the European Patent Office may reject a request for further oral proceedings before the same department where the parties and the subject of the proceedings are the same." These conditions are met in the present case. In the first place, there is no doubt that the parties are the same. In the second place, since the newly introduced feature - denier no more than 1.3 d - is irrelevant for the critical issue of inventive step for reasons which will appear hereinafter, the discussion of the allowability of the main request for the Contracting States DE, FR and GB and of the request for the Contracting State IT calls for exactly the same arguments. Since these arguments were presented at the oral proceedings of 8 January 1992, the subject of the new proceedings would in substance be the same. This means as well that the requirement under Article 113(1) EPC that "The decisions of the European Patent Office may only be based on grounds or evidence on which the parties concerned have had an opportunity to present their comments" is met.

For these reasons and for considerations of expediency, the Board decides to reject the conditional request of further oral proceedings presented by the Appellant.

5. In its statement filed on 4 March 1992 Respondent 1 relied on a new document, a pamphlet distributed by Degussa "Fortschritt durch Edelmetalle und Chemie", February 1977, pages 6 and 7, in order to demonstrate that microfine titanium dioxide particles having an average diameter of no more than 100 nm were in fact common, and that, therefore, the subject-matter of Claim 1 of the auxiliary request for the Contracting States DE, FR and GB (already present in granted Claim 7) was not inventive.

The Board has examined that citation, which was obviously produced well after the nine-month time limit for filing a Notice of Opposition, in order to determine its relevance, namely its evidential weight compared with that of the documents filed in time, and has found that it was not sufficiently relevant to be taken into consideration. This document will therefore be disregarded hereinbelow pursuant to Article 114(2) EPC.

6. The reimbursement of appeal fees is regulated in Rule 67 EPC. According to this provision an appeal fee shall be reimbursed where the Board of Appeal deems the appeal to be allowable, if such reimbursement is equitable by reason of a substantial procedural violation.

There is thus no basis in Rule 67 EPC for ordering the refund of the appeal fee in the present case. The fact that a Statement of Grounds of Appeal was not filed within the prescribed time limit did not prevent the appeal from becoming existent; it merely made it inadmissible (cf. Article 108 EPC, first and second sentences, and Rule 65(1) EPC). Only following its withdrawal the appeal became non-existent. The Convention not having established other conditions for the reimbursement of appeal fees than those mentioned in Rule 67 EPC, the request by Respondent 1 for reimbursement of the appeal fee must be rejected

(cf. also Decisions T 41/82, OJ EPO 1982, 256; T 13/82, OJ EPO 1983, 411; T 89/84, OJ EPO 1984, 526; J 12/86, OJ EPO 1988, 83 - Headnote only).

Main request for the Contracting States DE, FR and GB

7. The wording of the claims does not give rise to any objections under Article 123 EPC.

Claim 1 differs from Claim 1 as granted, which itself is in substance identical to Claim 1 as originally filed, by the additional requirement that the polyester fibre has a denier of no more than 1.3 d (1.43 dtex). That feature is supported by the passage of the patent specification on page 6, lines 44 to 46, corresponding to page 15, lines 21 to 24 of the original application, which specifies that "a copolyester embodying the present invention is preferably spun into a fine denier filament that is no more than 1.3 denier for producing soft hand fabrics ...".

As to the dependent Claims 2 to 6, they are identical to the granted as well as originally filed versions of these claims.

8. The patent in suit purportedly concerns an improved polyester fibre. In the opposition procedure, document (2) which describes a polyester fibre of unspecified tenacity, but having the same structural units as the polyester used in the patent in suit, was regarded as the closest state of the art. In the Board's view, it is more coherent and systematic to start from a document disclosing, like documents (1) and (19), a polyester fibre having the appropriate tenacity, which is a final property, and examine the question of inventive step on the basis of the correlation between the initial conditions which are freely chosen by the skilled man, i.e. the structural

units and the filament denier, and the properties of the fibre. It is self-evident that whichever starting point is taken, in the view of the Board the end result can only be the same.

Document (1) describes polyester fibres having a good affinity for basic type dyes which are prepared from terephthalic acid or an ester-forming derivative thereof, a polymethylene glycol and at least 0.5 mol percent, based on the terephthalate content of the polyester, of a compound containing at least one ester-forming functional group together with at least one sulfonate group in the form of a metallic salt (column 1, lines 11 to 19 and 31 to 47). Polymers containing 5-sulfoisophthalate units are said to be particularly preferred for their general properties, especially stability and colour properties as well as very low ether content (column 7, line 57 to column 8, line 2). The fibres described in Examples 1 and 3, which are produced from polyesters containing such units, have a tenacity of 4.0 g/d. However, in spite of a particular sensitivity of these fibres toward basic dyes (column 11, lines 12 to 35), the soft hand fabrics produced therefrom do not have a satisfactory depth of colour when the filament denier becomes less than 1.3 d (1.4 dtex).

In the light of this shortcoming the technical problem underlying the patent in suit can thus be seen in the provision of polyester fibres having an improved depth of colour when the denier is less than 1.3 d, without impairing their light resistance to unacceptable levels.

According to Claim 1 of the main request for the Contracting States DE, FR and GB, it is proposed to solve this problem by a polyester fibre obtained from a copolyester having a degree of polymerisation of from 80

to 100 and wherein 0.5 to 1.9 wt % of the polymer are poly(alkylene oxide) residues, the denier being less than 1.3 d.

9. However, the experimental data in the patent in suit show that this combination of features does not in fact provide a solution to the above-defined technical problem. Evidence of that failure is to be found in Examples 8 to 10 of the patent specification relied upon by the Appellant (Statement filed on 4 May 1992, point I.1), wherein fibres having a denier of 1.04 d are mentioned. According to Experiment 52, which is the only test carried out without incorporation of inert inorganic microfine particles, the copolyester fibre has a tenacity of 4.4 g/d, but the fabric produced therefrom has poor depth of colour (Table 12 and page 24, lines 27 and 28). This finding is not surprising, since it merely illustrates the general statement in the patent in suit, that "If the amount of the inert inorganic microfine particles added is less than 0.1 wt % based on the copolyester fibre obtained, the depth of colour of the dyed fabrics formed from the copolyester fibre obtained is unsatisfactory" (page 7, lines 25 to 27).

This means that the technical problem underlying the patent in suit can only be regarded as the provision of further polyester fibres having a tenacity of at least 4.0 g/d, a good affinity for basic dyes and a still acceptable resistance to oxidation, with additionally a denier no more than 1.3 d.

10. In its statement filed on 4 March 1992 Respondent 1 maintained that the teaching of document (17) is novelty destroying within the meaning of Article 54(3) EPC for the claimed subject-matter.

10.1 That citation discloses a polyester fibre with improved tenacity, the polyester itself being obtained from terephthalic acid (or dimethyl terephthalate) and a diol as major components, as well as 1 to 5 mol % of a metal sulfonate, in particular sodium dimethyl-5-sulfoisophthalate, and 0.5 to 12 wt % of a compound A, which is typically a polyethylene glycol with a molecular weight of 4000, as minor specific components (Claims 1 to 5; page 8, example of preparation). There is no mention of a suitable range regarding the degree of polymerisation; however, in view of the fact that intrinsic viscosities between 0.57 and 0.60 correspond to degrees of polymerisation between 86 and 88 and, more specifically, an intrinsic viscosity of 0.62 is said to correspond to a degree of polymerisation of 97 (cf. patent in suit, Tables 1 and 3, Experiments 1 to 14 and Table 4, Experiment 15), it can reasonably be assumed that, in spite of test methods not being strictly identical (solution of o-chlorophenol in the patent in suit; solution of phenol/tetrachloroethane 1:1 in document (17)), the value of intrinsic viscosity of 0.62 measured for the typical copolyester meets the requirement expressed in Claim 1 of the patent in suit. This assumption has not been disputed. It follows that all the structural features of the copolyester are described in document (17).

10.2 As far as the tenacity and the size of the filament are concerned, there are no explicit figures in document (17). However, the Board notes that the introductory section of that citation makes reference to several documents, in particular to document (19). As stated in the above-mentioned Decision T 153/85, "where there is a specific reference in one prior document (the "primary document") to a second prior document, when construing the primary document (i.e. determining its meaning to the skilled man) the presence of such specific reference may necessitate



that part or all of the disclosure of the second document be considered as part of the disclosure of the primary document" (Reasons for the decision, point 4.2, paragraph 3). In the present case, this means that the technical content of document (19) may be incorporated by reference into the disclosure of document (17) and that these two citations should be read as a single disclosure. Regarding the first parameter, thus, document (19) mentions yarns having tenacities of 4.2 and 4.0 g/d in Examples 1 and 2; however, the size of the filament which could be calculated from the diameter, respectively 71 and 70 deniers, and the number of holes, 23 in both cases, would be much higher than the diameter required in Claim 1 of the patent in suit.

In the statement filed on 4 March 1992, point I, Respondent 1 extended such combination of disclosures to document (1), for the sole reason that document (17) further mentions CH-A-373 559, which describes the preparation of the same sulfonate containing polyesters in view of the same application as document (1). This cannot be followed by the Board, for document (1) and CH-A-373 559 do not have the same priority date and can at most be regarded as technically closely related to each other. But even if one followed Respondent 1's approach, the combined teaching of documents (17) and (1) would not be novelty destroying for, as pointed out by the Appellant, the figure of 2.059 d (2.265 dtex) obtained by dividing the diameter, i.e. 70 denier, by the number of holes, i.e. 34, is almost twice that of the diameter required in Claim 1 of the patent in suit.

- 10.3 It follows that novelty of the claimed subject-matter within the meaning of Article 54(3) EPC is to be acknowledged on the basis of the latter parameter.

11. After examination of the other documents relied upon by the Respondents, the Board has come to the conclusion that a technical teaching according to Claim 1 of the main request for the Contracting States DE, FR and GB is not disclosed in any of them and that the subject-matter of that request is, therefore, novel within the meaning of Article 54(2) EPC. Since that particular issue has not been raised by Respondent 1, it is not necessary to consider this matter in detail.
  
12. It still remains to be decided whether that subject-matter involves an inventive step having regard to the teaching of the documents relied upon by the Respondents. In that respect, it follows from points 8 and 9 above that the issue of inventive step boils down to the question whether the combination of structural features characterising the polyester - degree of polymerisation and amount of poly-(oxyalkylene oxide) residues - together with a denier no more than 1.3 d can be regarded as inventive.
  - 12.1 Although the sulfonate containing polyesters described in document (1) comprise units derived basically from terephthalic acid and a polymethylene glycol as major components as well as units derived from 5-sulfoisophthalic acid as a minor component, other glycols or polymeric materials, especially those containing hydroxyl end groups, may be blended therewith in quantities of up to 10 wt % (column 9, lines 45 to 55). This suggests that the incorporation of such units in the polymer chain would not impair the affinity of the fibre for basic type dyes, nor the colour properties of that fibre.
  
  - 12.2 This combination of structural features is actually achieved in document (2), at least from a qualitative viewpoint. That citation describes a fibre-forming

copolyester which is obtained from at least one dicarboxylic acid, a glycol, a poly(alkylene oxide) having preferably a molecular weight 500 to 6000 and an organic compound containing sulfonate groups in the form of metal salt (column 1, lines 11 to 31). The proportions of the last two reactants are such that the copolymer contains 1 to 15 structural units derived from poly(alkylene oxide) per 100 total units and 0.5 to 10 structural units derived from sodium dimethyl-5-sulphoisophthalate per 100 total units (Claim 1). According to Example 2, which provides in conjunction with Example 1 the only accurate information regarding the amounts of the four reactants, a typical copolyester would be obtained from 194 parts of dimethyl terephthalate, 155 parts of ethylene glycol, 5.92 parts of sodium dimethyl-5-sulphoisophthalate and 9.7 parts of poly(ethylene oxide) having a molecular weight of 1540. The combination of the structural units derived from the last two starting compounds is said to give rise to a synergistic effect which enhances the affinity of the fibres towards basic dyestuffs (Examples 2 and 3; column 3, lines 1 to 7).

It is true, as pointed out by the Appellant in its statement filed on 4 May 1992 (point II.4), that in such copolyester the amount of units derived from poly(alkylene oxide) is outside the range specified in Claim 1 of the patent in suit. Even in the case of a copolyester containing only one unit of poly(ethylene oxide) having a molecular weight of 500, corresponding thus to the lowest possible figure, per 100 total structural units, the amount by weight of such unit would be about 2.5 wt %, thus more than the upper limit of 1.9 wt % of the range required in the patent in suit.

12.3 In the Board's view, however, the skilled man would have three good reasons to lower the amount of structural units

derived from poly(alkylene oxide) in the copolyesters while still following the promising teaching of document (2).

The first reason results from the definition of the technical problem to be solved, according to which the resistance to oxidation should not be impaired to unacceptable levels. Since the sensitivity of the polymer to light and oxidation is largely caused by the ether units in the chain, the skilled man would self-evidently look for a solution wherein the amount of such units would be limited.

The second reason is given in document (1) which emphasises that one of the advantageous properties of polyesters containing units derived from 5-metal sulfoisophthalic acid dimethyl ester is their very low ether content (column 7, line 57 to column 8, line 2). In the Board's view the skilled man would not forgo this advantage by departing from that teaching.

The third reason is provided by document (19) which describes polyesters having improved dyeing affinity prepared from terephthalic acid, an alkylene glycol and a sulfonated polyether, the amount of the latter component being such that the final product contains preferably 0.2 to 15 wt % of polyether and 0.2 to 10 metal sulfonate groups per 100 units of polyester (column 3, lines 23 to 30; column 4, lines 1 to 6). The yarns obtained from these polyesters have tenacities of 4.2 g/d in Example 1 and 4 g/d in Example 2. Such quantitative figures, which correspond to polyester fibres of high tenacity and good affinity for basic dyes, are in line with the requirements specified in Claim 1 of the patent in suit.

- 12.4 The other two parameters mentioned in Claim 1 cannot contribute to the inventiveness of the solution claimed by the Appellant.

The suitable degree of polymerisation can easily be determined by the skilled person, if necessary on the basis of trial and error, bearing in mind, first, that a too high degree of polymerisation would result in a too high melt viscosity causing difficulties during the melt spinning as well as impairing the tenacity of the fibre, and, secondly, that the degree of polymerisation should be high enough to allow a decrease in molecular weight during the melt spinning. It follows that the appropriate degree of polymerisation simply results from these opposite requirements and that as such the range of from 80 to 100 cannot be regarded as an inventive feature.

As to the size of the filament, it is not clear in the absence of any argument by the Appellant or any statement in the patent specification to which surprising effect or unexpected property this parameter, which is determined by the spinning conditions, could be related in the framework of this less ambitious technical problem. It must be regarded as an arbitrary value of that parameter, for which no inventive step can be acknowledged.

- 12.5 For these various reasons, the subject-matter of Claim 1 of the main request for the Contracting States DE, FR and GB does not involve any inventive step.
13. Claim 1 not being allowable, the same applies to the dependent Claims 2 to 6, which are directed to preferred embodiments of the subject-matter of the main claim and thus fall with it.

Auxiliary request for the Contracting States DE, FR and GB

14. The wording of the claims does not give rise to any objections under Article 123 EPC.

Claim 1 differs from Claim 1 as granted, which itself is in substance identical to Claim 1 as originally filed, by the incorporation into the polymer of "from 0.1 to 4 weight percent, based on the weight of the fibre, of inorganic microfine particles having an average diameter of no more than 100 nm". That feature is the subject-matter of Claim 7 as granted and originally filed. As to the dependent Claims 2 to 6, they are identical to the granted as well as originally filed versions of these claims.

15. In the absence of any requirement regarding the filament denier in Claim 1, nearly all the experimental data in Tables 9, 10 and 11 of the patent in suit can be used to demonstrate that the above-defined technical problem is effectively solved by a polyester fibre having a tenacity of at least 4 g/d comprising a copolyester as defined in the main request and a filler according to feature (b).
16. The combination of feature (b) with the structural features (a) must be regarded as novel within the meaning of Article 54(3) EPC.

Although document (17) mentions the addition of up to 2 wt % of titanium dioxide to polyester (page 8, lines 12 to 14; page 9, line 1), there is no indication about the diameter of these particles. Even if the teaching of document (3) cited in the introductory section of document (17) is incorporated therein by reference, there is no disclosure of the diameter of the titanium dioxide particles. As pointed out by the Appellant, titanium

dioxide is added to polyethylene terephthalate in Example I of document (3) as a delusterant (see as well column 2, lines 10 to 14) and there is no reason to believe that this adjuvant could have a different function in the other examples where it is used (Examples II, III and V to VIII); to be practically useful for such purpose, the particles should have an average diameter of 0.5 to 1.0  $\mu\text{m}$ , which cannot be regarded as corresponding to microfine particles (statement filed on 4 May 1992, point III.4). This argument, from which it follows that there is no implicit disclosure in document (17) of a range of diameter of inert inorganic particles within the terms of the patent in suit, has not been disputed by the Respondents and is also accepted by the Board. Consequently, novelty under Article 54(3) EPC of the subject-matter as defined in Claim 1 is acknowledged on the basis of feature (b).

17. After examination of the other documents relied upon by the Respondents the Board has come to the conclusion that a technical teaching according to Claim 1 of the auxiliary request for the Contracting States DE, FR and GB is not disclosed in any of them and that the subject-matter of that request is, therefore, also novel within the meaning of Article 54(2) EPC. Since that particular issue has not been raised by the Respondents, it is not necessary to consider this matter in detail.
  
18. It still remains to be decided whether that subject-matter involves an inventive step having regard to the teaching of the document relied upon by the Respondents.

The sole mention in several documents of the possibility of incorporating pigments and delusterants, such as titanium dioxide, into the copolyester cannot be an incentive for the skilled person to do the same in view of

the properties to be improved, let alone define a specific range for the particle size of that additive. This applies in the first place to document (1) (column 9, lines 42 to 44) and document (3) (column 2, lines 10 to 14; Examples I to III and V to VIII), the latter disclosing the addition of 0.27 to 0.45 wt % of titanium dioxide acting presumably as a delusterant in all the examples.

The teaching of document (6) can be regarded as an attempt to overcome some of the drawbacks resulting from the addition of finely-divided inert materials to polyester before spinning; although a reduced luster may be attained by adding titanium dioxide, at the same time the fibre opacity is increased and the desired reduction in friction is not obtained (column 1, lines 20 to 35). The improvement consists in the incorporation of finely-divided particles of kaolinite having equivalent spherical diameters in the range of 0.2 to 7  $\mu\text{m}$  (column 1, lines 48 to 65), advantageously in combination with conventional titanium dioxide delusterant, the control of the kaolinite/titanium dioxide ratio allowing the preparation of yarns with suitable luster effects hitherto unobtainable (column 2, lines 21 to 27). Even if one assumed for the sake of argument that for practical reasons the granularity of titanium dioxide should correspond to that of kaolinite, the range of 0.2 to 7  $\mu\text{m}$  would not correspond to the values required in Claim 1 of the patent in suit.

For these reasons the Board concurs with the Opposition Division that the incorporation of inert inorganic microfine particles having an average diameter of no more than 100 nm in order to increase the depth of colour of polyester fibres is an inventive feature. The subject-matter of the auxiliary request for the Contracting States DE, FR and GB thus involves an inventive step.



19. Claim 1 being allowable, the same applies to dependent Claims 2 to 6, which are directed to preferred embodiments of the subject-matter of Claim 1 and whose inventiveness is supported by that of the main claim.

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20. The wording of the claims does not give rise to any objections under Article 123 EPC, since Claims 1 to 6 are identical to the granted as well as originally filed version of these claims.
21. As stated above when dealing with the main request for the Contracting States DE, FR and GB, in the absence of inert inorganic microfine particles the polyester fibres having a tenacity of 4.4 g/d and a denier of 1.04 d give a fabric having poor depth of colour (see Table 12, Experiment 52 read in conjunction with page 23, lines 1 and 2). By contrast, Example 6 read in conjunction with page 19, line 15 and Table 7, experiment 31, shows that by using polyester fibres having a tenacity of 4.3 g/d and a denier of 2.08 d, silky fabrics having excellent depth of colour can be produced even without addition of such microfine particles.

This means that polyester fibres having a tenacity within the terms of Claim 1 and being derived from polyesters meeting all the structural requirements specified in Claim 1 may or may not solve the above-defined technical problem. It follows that the combination of features according to the main claim encompasses embodiments which do not provide a solution to that problem, in other words that the solution according to Claim 1 is not a general solution to that problem.

For the same reasons as above, the technical problem underlying the patent in suit has thus to be defined in less ambitious terms; as demonstrated in point 12 above, the solution thereof does not embody an inventive step.

22. Under these circumstances it is not necessary to examine whether the subject-matter of Claim 2 of that request may not even be novel with regard to the teaching of document (2), as alleged by Respondent 1.
23. Claim 1 not being allowable, the same applies to the dependent Claims 2 to 6, which are directed to preferred embodiments of the subject-matter of the main claim and thus fall with it.

#### Order

For these reasons, it is decided that:

1. The request for further oral proceedings is rejected.
2. The decision under appeal is set aside.
3. The main request for the Contracting States DE, FR and GB is rejected.
4. The request for the Contracting State IT is rejected.
5. The case is remitted to the Opposition Division with the order to maintain the patent on the basis of Claims 1 to 6 filed during oral proceedings as auxiliary request for the Contracting States DE, FR and GB and a description yet to be adapted.

6. The costs in the appeal procedure shall be apportioned so that the Appellant shall pay to Respondent 1 all the costs incurred by Respondent 1 in preparing and filing the written statement dated 2 March 1992.
  
7. The request of Respondent 1 for reimbursement of the appeal fee is rejected.

The Registrar:



E. Gorgmaier

The Chairman:



F. Antony