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**Datasheet for the decision
of 26 March 2024**

Case Number: T 1701/21 - 3.3.03

Application Number: 14737041.5

Publication Number: 3011086

IPC: D01F6/00, D01F6/62

Language of the proceedings: EN

Title of invention:

PROCESS FOR THE PREPARATION OF A FIBER, A FIBER AND A YARN MADE
FROM SUCH A FIBER

Patent Proprietor:

Furanix Technologies B.V.

Opponent:

Trevira GmbH

Relevant legal provisions:

RPBA 2020 Art. 12(4), 12(6), 13(2), 11
EPC Art. 56, 111(1)

Keyword:

Late-filed evidence - circumstances of appeal case justify
admittance (yes)

Inventive step (no) (main request and first auxiliary request)

Late-filed requests admitted (yes)

Remittal - special reasons for remittal

Decisions cited:

T 0187/93, T 0296/93, T 0207/94



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Case Number: T 1701/21 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 26 March 2024

Appellant: Trevira GmbH
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
19 July 2021 concerning maintenance of the
European Patent No. 3011086 in amended form.**

Composition of the Board:

Chairman D. Semino
Members: F. Rousseau
A. Bacchin

Summary of Facts and Submissions

I. The appeal lies from the interlocutory decision of the opposition division according to which European patent No. 3 011 086 as amended according to the claims of the first auxiliary request submitted during the oral proceedings on 25 June 2021 and a description adapted thereto met the requirements of the EPC. The decision was also based on the rejection of the opposition as the main request.

II. The decision was taken having regard to the following documentary evidence amongst others:

D4: E. de Jong *et al.*, "Furandicarboxylic Acid (FDCA), A Versatile Building Block for a Very Interesting Class of Polyesters", ACS, In Biobased Monomers, Polymers, and Materials, Chapter 1 (2012)

D6: JP 2008-291243 A and translation thereof in English
D6a

D7: JP 2008-291244 A

D12: Franz Fourne, "Synthetische Fasern", Carl Hanser Verlag, 1995, pages 736-739 and 817

D13: Franz Fourne, "Synthetische Fasern", Carl Hanser Verlag, 1995, pages 196-201

D16: EP 0 446 822 A1

D17: EP 0 590 629 A2

D18: EP 0 530 769 A1

D19: "Correlation between fiber titer and diameter"

D20: "Avantium's YXY: Green Materials and Fuels", presentation by Frank Roerink on 15 February 2011.

III. According to the reasons for the contested decision which are pertinent for the appeal proceedings, i.e. those concerning inventive step:

- (a) The closest prior art was represented by D6 or D7. It had been found in respect of claim 1 of the main request that the preparation of a fibre comprising polyethylene-2,5-furan-dicarboxylate (PEF) with an intrinsic viscosity of at least 0.55 dl/g, by melt spinning wherein the spun fibres were drawn to a linear density in the range of 0.05 to 2.0 tex per fibre was obvious to a skilled person in the light of documents D12 and D16 to D20.
- (b) However, in relation to the additional features present in claim 1 of the first auxiliary request, the skilled person wishing to provide an alternative method for producing PEF fibres having increased tenacity, would have found no guidance in the prior art to select a combination of a draw ratio of 1:1.4 to 1:6.0 and temperature of 80-150°C for a secondary drawing step.

Drawing of polyester monofilaments in two or more stages to increase tenacity was known. However, the opponent had not submitted any evidence that this was known for PEF fibres. In any case, the experimental data of the patent in suit demonstrated that the selection of the draw ratio and the temperature in the secondary drawing step as defined in the first auxiliary request were not merely arbitrary, since certain combinations of these parameters outside the scope of claim 1 (examples 36, 37, 41, 44, 45, 49-52) provided little or even no improvement in tenacity compared with a primary drawing step alone.

(c) The method of claim 1 according to the first auxiliary request was therefore inventive.

IV. An appeal against that decision was lodged by the opponent (appellant). With the statement setting out the grounds of appeal, the following documents were in particular submitted:

D22: US 2012/0238170 A1

D23: Excerpt of the Handbook of Fiber Chemistry, second edition, edited by M. Lewin, Marcel Dekker, Inc. 1998, one page

D24: CA 867867

D25: US 3,816,486.

V. With the reply to the statement of grounds of appeal the patent proprietor (respondent) submitted three sets of claims as first to third auxiliary requests.

VI. Both parties made further submissions, namely the appellant with letter of 12 May 2022 and the respondent with letter of 23 October 2023.

VII. In preparation of the oral proceedings, a communication pursuant to Article 15(1) RPBA 2020 conveying the Board's provisional opinion was issued.

VIII. Following the Board's written provisional opinion, the respondent with letter of 19 February 2024 filed two additional set of claim requests labelled auxiliary requests 2a and 2b and submitted in addition document D23a consisting of three additional pages of the Handbook from which D23 is an excerpt.

IX. Oral proceedings before the Board were held on 26 March 2024.

X. The final requests of the parties were as follows:

- The appellant requested that the decision under appeal be set aside and the patent be revoked. The appellant further requested that the first to third auxiliary requests not be admitted into the proceedings.

- The respondent requested that the appeal be dismissed, or alternatively that the contested decision be set aside and that the patent be maintained on the basis of any of the claims of the first, second and third auxiliary requests, all filed with the reply to the statement of grounds of appeal or further auxiliarily on the basis of the set of claims of auxiliary request 2a or 3a, filed with letter of 19 February 2024. It was further requested that documents D22 to D25 not be admitted into the proceedings.

XI. The claims relevant to the present decision are as follows:

Main request (first auxiliary request submitted during the oral proceedings on 25 June 2021)

"1. Process for the preparation of a fiber having a tenacity ranging from 200 to 1,000 mN/tex according to ISO 5079-1995 comprising polyethylene-2,5-furan-dicarboxylate, by melt spinning, wherein a molten composition comprising polyethylene-2,5-furan-dicarboxylate having an intrinsic viscosity of at least 0.55 dl/g, determined in dichloroacetic acid at 25°C,

is passed through one or more spinning openings to yield molten threads;
wherein the molten threads are cooled to below the melting temperature of the composition to yield spun fibers; and
wherein the spun fibers are drawn in a secondary drawing step at a draw ratio of 1:1.4 to 1:6.0 and at a temperature in the range of 80 to 150 °C to a linear density in the range of 0.05 to 2.0 tex per fiber."

First auxiliary request (submitted with the rejoinder)

"1. Process for the preparation of a fiber comprising polyethylene-2,5-furan-dicarboxylate which fiber has a tenacity ranging from 200 to 1,000 mN/tex according to ISO 5079-1995 by melt spinning, wherein a molten composition comprising polyethylene-2,5-furan-dicarboxylate having an intrinsic viscosity of at least 0.55 dl/g, determined in dichloroacetic acid at 25°C, is passed through one or more spinning openings to yield molten threads;
wherein the molten threads are cooled to below the melting temperature of the composition to yield spun fibers; and wherein the spun fibers are drawn in a secondary drawing step at a draw ratio of 1:1.4 to 1:6.0 and at a temperature in the range of 80 to 150 °C to a linear density in the range of 0.05 to 2.0 tex per fiber,
wherein the molten composition comprises from 75 to 100 %wt polyethylene-2,5-furan-dicarboxylate, based on the weight of the molten composition".

Second auxiliary request (submitted with the rejoinder)

"1. Process for the preparation of a fiber comprising polyethylene-2,5-furan-dicarboxylate having a weight

average molecular weight in the range of from 50,000 to 95,000 which fiber has a tenacity ranging from 200 to 1,000 mN/tex according to ISO 5079-1995 by melt spinning, wherein a molten composition comprising polyethylene-2,5-furan-dicarboxylate having an intrinsic viscosity of at least 0.55 dl/g, determined in dichloroacetic acid at 25°C, and a weight average molecular weight in the range of from 65,000 to 180,000 is passed through one or more spinning openings to yield molten threads; wherein the molten threads are cooled to below the melting temperature of the composition to yield spun fibers; and wherein the spun fibers are drawn in a secondary drawing step at a draw ratio of 1:1.4 to 1 : 6.0 and at a temperature in the range of 80 to 150 °C to a linear density in the range of 0.05 to 2.0 tex per fiber."

"5. Fiber comprising polyethylene-2,5-furan-dicarboxylate, after drawing, having a linear density of 0.05 to 2.0 tex, wherein the polyethylene-2,5-furan-dicarboxylate has an intrinsic viscosity of at least 0.45 dl/g, determined in dichloroacetic acid at 25°C and a weight average molecular weight in the range from 50,000 to 95,000 which fiber has a tenacity ranging from 200 to 1,000 mN/tex according to ISO 5079-1995."

The characters in underline denote additional features to the independent claims of the operative first auxiliary request directed to a fibre and a process for the preparation of a fibre.

Third auxiliary request (submitted with the rejoinder)

Claim 1 of the third auxiliary request corresponds to claim 1 of the second auxiliary request with the

following additional wording at the end of the claim "and wherein the molten composition comprises from 75 to 100 %wt polyethylene-2,5-furan-dicarboxylate, based on the weight of the molten composition". Claim 4 of the third auxiliary requests corresponds to claim 5 of the second auxiliary request with a similar modification defining that the "fiber comprises from 75 to 100 %wt of the polyethylene-2,5-furan-dicarboxylate, based on the weight of the fiber".

The wording of the claims of auxiliary request 2a or 3a is not relevant for the present decision.

- XII. The parties' submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. The contentious point essentially concerned the question whether document D22 to D25 and D23a should be admitted into the proceedings, whether the process of claim 1 of the main request and the one of claim 1 of the first auxiliary request were inventive over the teaching of D6 and whether the first to third auxiliary requests should be admitted into the proceedings.

Reasons for the Decision

Admittance of D22 to D25 and D23a

1. The filing of documents D22, D23, D24 and D25 with the statement of grounds of appeal is to be regarded as an amendment to the appellant's case within the meaning of Article 12(4) RPBA. Their admittance to the proceedings, which is contested by the respondent, is

subject to the discretionary power of the Board in accordance with Article 12, paragraphs (4) to (6) RPBA. Pursuant to Article 12(4) RPBA, the Board shall exercise its discretion 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.

According to Article 12(6) RPBA, the Board shall not admit evidence which should have been submitted in the proceedings leading to the decision under appeal, unless the circumstances of the appeal case justify their admittance.

1.1 Based on the appellant's submissions, it can be agreed that:

- D22 which concerns a fibrous web formed from a thermoplastic polymer comprising a polyester (claim 1) was cited to demonstrate similarities between PEF and polyethyleneterephthalate (PET) in the context of fibres, reference being made to paragraph [0151] of that document (statement of grounds of appeal, page 12, second paragraph),

- D23 was submitted to demonstrate that a two-step drawing of fibres at high draw ratio and the achievement of fibres having high tenacity are linked for polyesters (statement of grounds of appeal, page 13, last paragraph),

- D24 and D25 were filed to show that a two-step stretching for obtaining fibres with high tenacity was known for polyester of the PET type (statement of grounds of appeal, page 14, first paragraph).

Therefore, documents D22, D23, D24 and D25 have been submitted in order to demonstrate that a two-step stretching, which was acknowledged to be known for PET to increase the tenacity of the fibres, would be expected by the skilled person to provide the same effect for PEF fibres. Those documents have been therefore filed as a legitimate reaction to the finding of the opposition division that the drawing of PEF monofilaments in two or more stages to increase tenacity had not been shown to be suggested by the prior art.

1.2 The respondent submitted at the oral proceedings before the Board that the appellant was well aware since the beginning of the opposition proceedings of the relevance of the alleged equivalence of PEF and PET, as shown by the paragraph bridging pages 8 and 9 of the notice of opposition in which said equivalence is addressed. Accordingly, there was in the respondent's opinion no reason to submit D22 only at the appeal stage.

1.3 In view of the course of events before the opposition division this is, however, not convincing:

The appellant (then opponent) had submitted in their written submissions of 4 March 2020 on the basis of D11-3 (renumbered as D11b in the opposition division's communication of 10 June 2020 and D13 in the contested decision) that a draw ratio from 1:1.4 to 1:6.0 was common for polyesters in order to adjust strength and elongation properties of the fibres (see paragraph bridging pages 3 and 4 of that letter).

In their preliminary opinion contained in the communication of 10 June 2020 (page 2, first and second full paragraph) issued in preparation of the oral proceedings, the opposition division submitted regarding this argument based on D11b that it could not be assumed that the draw ratios used in the contested patent corresponded to those that would be used for producing PET or other polyester fibres, given the fact that the chemical structure of PEF was very different from that of PET.

In answer to the opposition division's opinion, the appellant submitted with letter of 5 March 2021 document D18 (renumbered D20 in the contested decision) which in their view demonstrated that for the skilled person PET and PEF were analogous materials and could be processed on a commercial plant for PET. Reference was made by the appellant to pages 12 and 9 of that document (see page 5, third full paragraph of the letter dated 5 March 2021).

The opposition division, however, decided in relation to the first auxiliary request that the drawing of PEF fibres monofilaments in two or more stages to increase tenacity was not known (Reasons for the decision, page 16, fourth paragraph).

Moreover, the first auxiliary request underlying the contested decision corresponds in essence to the third auxiliary request (i.e. without the definition of the norm for measuring the tenacity) filed with the respondent's letter of 5 March 2021, i.e. about four months before the oral proceedings. It was the first claim request in which the range of tenacity values of the fibres was mandatory, besides that in combination with the range of draw ratio values and the range of

temperatures to be used for the secondary drawing step. In addition no submission concerning inventive step in relation to that combination of features were submitted by the respondent before the oral proceedings.

In fact, the significance for the inventive step assessment of the tenacity values in combination with the conditions for the secondary drawing step (draw ratio and temperature) was discussed for the first time during the opposition oral proceedings.

- 1.4 On that basis, it was legitimate for the appellant to submit at the outset of the appeal proceedings documents D22, D23, D24 and D25 obviously meant to counter the lack of suggestion in the prior art to use a secondary drawing step for PEF fibres to increase tenacity, as indicated in point 1.1 above.

Accordingly, taken into account the above mentioned circumstances, the Board exercised its discretion under Article 12(4) and 12(6) RPBA by admitting documents D22, D23, D24 and D25 into the proceedings.

2. D23a has been submitted by the respondent with letter of 19 February 2024 in response to the intention of the Board expressed in its preliminary opinion to admit document D23 into the proceedings. Its admittance is therefore subject to the provisions of Article 13(2) RPBA.

- 2.1 In the respondent's opinion, if D23 was to be admitted into the proceedings, it should be read in context, i.e. necessitating the reading of the three additional pages submitted with D23a. Although D23a could have been submitted earlier, i.e. independently from the Board's preliminary opinion and already with the

rejoinder, that document merely confirms, as pointed out by the respondent (letter of 19 February 2024, paragraph bridging pages 3 and 4) and already anticipated in section 6.14 of the rejoinder, that the information provided with D23 concentrates particularly upon PET and its copolymers.

- 2.2 Considering in addition that the appellant had no objection to its admittance, the Board decided that the specific situation amounted to exceptional circumstances within the meaning of Article 13(2) RPBA on the basis of which D23a was to be taken into account.

Main request

Inventive step

Closest prior art

3. It is undisputed that the closest prior art can be represented by the teaching of document D6 describing furan containing resins and their use in a large variety of applications (respondent's letter of 23 October 2023, section 3.3). Within D6 examples 5 and 7 describing PEF having an intrinsic viscosity of at least 0.55 dl/g (paragraphs [0091] to [0094] of D6a and table 1 of D6) are particularly relevant.

D6, however, as correctly pointed out by the respondent does not disclose that the PEF obtained in examples 5 or 7 of D6 have been used for the preparation of fibres, the preparation of fibres being solely disclosed in the general teaching of D6 in its paragraphs [0077] ("spun bond method"), [0078] ("fibers") and [0080] ("monofilaments, non-woven

fabrics", "crimped fibers", "multifilaments") (all paragraphs refer to D6a).

Distinguishing features

4. It is undisputed that the method of operative claim 1 differs from the closest prior art in that:
 - (i) fibres are prepared by melt spinning the molten PEF by passing it through one or more spinning openings to yield molten threads, wherein the molten threads are cooled to below the melting temperature of the composition to yield spun fibres that have a linear density in the range of 0.05 to 2.0 tex per fibre,
 - (ii) the fibres obtained have a tenacity ranging from 200 to 1000 mN/tex according to ISO 5079-1995, and
 - (iii) the method comprises a secondary drawing step at a draw ratio of 1:1.4 to 1:6.0 and at a temperature in the range of 80 to 150 °C.

Problem successfully solved

5. The problem successfully solved by the method of claim 1 was formulated by both parties in the written procedure as the provision of a process for the manufacture of fibres comprising PEF which have a tenacity ranging from 200 to 1000 mN/tex (statement of grounds of appeal, page 15, third paragraph; rejoinder, page 4, section 6.1). In view of the Board's remark in its preliminary opinion that such formulation was questionable, as it would contain a pointer to the claimed solution in respect of the range of tenacity values, which range is defined in operative claim 1, the parties were in agreement at the oral proceedings

that the problem successfully solved over the closest prior art should be rather formulated as the provision of a process for the preparation of PEF fibres with high tenacity. The Board has no reason to take a different approach.

Obviousness of the solution

6. It remains to be decided whether, in view of the disclosure of D6, and possibly in combination with other prior art documents or common general knowledge, the skilled person desiring to solve the above problem would have found it obvious to operate modifications (i) to (iii) identified in point 4 above.
- 6.1 Concerning modification (i), in line with the finding of the opposition division concerning the main request underlying the contested decision (see above section III(a)), it was uncontested that the modification of the closest prior art consisting in preparing fibres by melt spinning the molten PEF by passing it through one or more spinning openings to yield molten threads, wherein the molten threads are cooled to below the melting temperature of the composition to yield spun fibres that have a linear density in the range of 0.05 to 2.0 tex per fibre, was obvious to a skilled person in view of documents D12 and D16 to D20 (contested decision, point 2.4 of the Reasons).

In addition, D20 like D6 aims at replacing polyesters such as PET produced from petroleum raw material by PEF. In this respect, D20 (slides 9, 12, 18) confirms that the skilled person was aware that PEF was suitable for the production of fibres for textile and carpets as a replacement for petroleum based PET fibres. This teaching is also to be found in D4 (sentence bridging

pages 2 and 3, page 7, last sentence of the first paragraph). According to that document, it was aimed at replacing oil-based polyesters such as PET with polyesters based on 2,5-furandicarboxylic acid (FDCA) such as PEF in a wide range of applications, including bottles and fibres (D4, abstract, paragraph bridging pages 2 and 3). D22 also describes in its paragraph [0151] that PEF serves as either a sole replacement or a blend with petro based PET (or another suitable polymer) in spunbond fibres and the subsequent production of a non-woven based on these fibres with renewable materials. The fact that PEF is considered in D22 as an alternative to PET in the invention described therein is also underlined with dependent claim 4 and dependent claim 3 of that document defining the use of these polymers, respectively, as thermoplastic materials for the preparation of fibres.

- 6.2 Concerning modifications (ii) and (iii), the appellant referred to document D22 and the common general knowledge described in D23.
- 6.2.1 It is undisputed that D23 is an excerpt of an Handbook of Fibre Chemistry which essentially concerns PET and its copolymers (see also D23a as referred to in point 2.1 above). According to D23, polyester spun yard are subject to a drawing process to obtain commercially useful yarn of high orientation (emphasis here and below by the Board), which drawing step is preferably carried out above the glass transition temperature of the spun yard to obtain a uniform product (D23, lines 1-8). Total draw ratios usually lie between 3:1 and 6:1, the higher draw ratios being applied in the production of high-tenacity yarns and often involving a two-stage drawing process wherein the second stage is carried out at a somewhat higher temperature, applying

a draw ratio up to 1.5:1 (D23, lines 11-15). Three-stage drawing processes are described to be used for products of the highest tenacity (D23, lines 15-16). D23 also describes that some crystallinity is introduced into the yarn during the process of drawing to these draw ratios (lines 17-18). In other words, it is common general knowledge that the step of drawing spun PET fibres induces molecular orientation and crystallinity, resulting in an increase of tenacity.

6.2.2 Having regard to paragraph [0151] of D22 according to which an alternative to bio-sourced PET in spunbond fibres can include renewable PEF that is indicated to have similar thermal and crystallization properties to PET, the skilled person would be prompted to prepare PEF fibres using measures similar to those taken for the preparation of PET fibres, i.e. using one or more drawing stages to increase their tenacity. This is because the express indication concerning thermal and crystallization properties for PET would be immediately understood by those skilled in the art in view of the common general knowledge indicated in D23 to refer to the relevance of these properties for inducing molecular orientation and crystallinity in the preparation of PET fibres resulting in a higher tenacity.

6.2.3 The respondent argues that a person skilled in the art would know that the sweeping statement of paragraph [0151] of D22 on similarities between PEF and PET lacks a basis. They referred in this context to several differences between PET and PEF (glass transition temperature (T_g), melting temperature (T_m), density, tensile strength and elongation at break) which would be well known and described on page 9 of D4 (rejoinder, sections 6.10 and 6.4).

This is not convincing for the Board. Although that passage of D4 indicates that the Tg of PEF is higher while the Tm is lower, this is not necessarily in contradiction with the indication in D22 of thermal and crystallization properties for PEF similar to PET. Moreover, the technical information provided in the last paragraph of that page nevertheless suggests that PEF is also subject to strain induced crystallisation similar to PET ("*Drawing & strain hardening/SIC of PEF is similar with PET*"), which information in the Board's opinion would also prompt the skilled person to draw the PEF fibres to increase their tenacity.

6.2.4 In view of the above, the skilled person starting from the closest prior art and wishing to provide a process for the preparation of PEF fibres with high tenacity, would have found the suggestion to try measures similar to those employed for this purpose in the preparation of PET fibres, namely the use of one or more drawing stages at a temperature between the Tg and the Tm of the polymer and an appropriate draw ratio to induce orientation/crystallization of the spun fibres.

6.2.5 While it was agreed that the examples 5 and 7 with an intrinsic viscosity within the range defined in operative claim 1, i.e. of at least 0.55 dl/g, represented a suitable starting point for assessing inventive step, the respondent argued that there was no hint that the manufacture of high tenacity PEF could be done starting from PEF having an intrinsic viscosity of at least 0.55 dl/g (letter of 23 October 2023, section 3.3). In the respondent's opinion, it had to be taken into account that the documents submitted in the opposition proceedings had been obtained with foreknowledge of the invention. It was added that

according to paragraph [0006] of the specification the processes of making PEF fibres described in WO 2013/149222 and WO 2013/149157 concerned PEF with an intrinsic viscosity below 0.45 dl/g for which filaments appeared not to have a measurable tenacity.

This is also not convincing. This argument would mean that the choice of examples 5 and 7 as starting point for the invention defined in operative claim 1 would be based on hindsight, which argument is in contradiction with the respondent's agreement to the position that those examples can be taken as starting point for assessing inventive step. In any event the polyester resins of D6 have an intrinsic viscosity of at least 0.48 dl/g (D6a, paragraph [0008]). Although, fibres were not tested in D6, that document nevertheless teaches by referring to the experimental results shown in table 1 that a thermoplastic resin having a furan structure in its main chain exhibits very good mechanical strength (D6a, paragraph [0099]). This teaching is coherent with the object of the invention described in D6 (paragraphs [0005] and [0006] of D6a) which is to improve the mechanical properties of polyesters based on 2,5-furan-dicarboxylic acid by producing them with a sufficient molecular weight. Moreover, the skilled person would not only find in D6 the suggestion to use PEF for making fibres (point 3 above, third paragraph, reference being made to the passages of D6a), but, confronted with the problem of providing high tenacity PEF, would be guided by the common general knowledge to start from a PEF having a sufficient molecular weight and for that reason would start from those PEF in D6 having the highest molecular weight, i.e. the highest intrinsic viscosity. Those are described in examples 5 and 7 (see D6a, paragraphs

[0091] to [0094] and table 1 of D6) taken as starting point for the assessment of inventive step.

- 6.2.6 Referring to decisions T 207/94 and T 187/93 the respondent argued that the skilled person starting from the closest prior art could have hoped, but would not have reasonably expected, to successfully obtain PEF fibres having high tenacity.

This is in the Board's opinion also not convincing. According to T 207/94 the "hope to succeed" is the mere expression of a wish whereas "a reasonable expectation of success" requires a scientific evaluation of the facts at hand (point 31 of the Reasons). According to T 296/93 (see point 7.4.4 of the Reasons) which is referred to in point 31 of the Reasons of T 207/94, "a reasonable expectation of success" which should not be confused with the understandable "hope to succeed", implies the ability of the skilled person to reasonably predict, on the basis of the existing knowledge before the starting of a research project, a successful conclusion to the said project within acceptable time limits. The more unexplored a technical field of research is, the more difficult is the making of predictions about its successful conclusion and, consequently, the lower the expectation of success. According to T 187/93 (see point 21 of the Reasons), in which T 296/93 is also referred to, *"even if an experiment is obvious to try for the skilled person, it is not necessarily true that this person would have any reasonable expectation of success when embarking on it"*.

Having regard to the reasons given in 6.2.1 to 6.2.5, in particular in view of similarities between PET and PEF which are relevant for obtaining high tenacity PET

fibres, the Board comes to the conclusion that the skilled person starting from the PEF synthesized in D6 would not have merely expressed the wish to obtain PEF fibres having high tenacity, but would have had a reasonable expectation of success when applying the secondary drawing step defined in operative claim 1.

- 6.2.7 Concerning the selection of a two-stage drawing step, i.e. versus the use of one single drawing step which is also taught in D23, it can be agreed with the respondent's remark (rejoinder, section 6.2) that the effect of the draw ratio, namely an increase of tenacity, can be seen from comparing in the patent in suit experiments 36 and 37 of example 4 with experiments 38, 39 and 40 or from comparing experiment 41 with experiments 42 and 43 and/or from comparing experiment 44 and 45 with experiments 46-48. However, as noted by the appellant, experiments 27 to 35 of the specification demonstrate that a single drawing step can result in fibres with tenacity values within the range defined in operative claim 1. In other words, a secondary drawing is not a necessary step to obtain PEF fibres having the tenacity set out in operative claim 1.

Moreover, the available evidence concerning the use of a two-stage drawing process in table 4 of the patent in suit starting with experiment 36 does not comprise experiments with temperatures outside the range defined in operative claim 1 or data corresponding to a secondary drawing ratio higher than 6.

Accordingly, the selection of a two-stage drawing and the selection of ranges for the draw ratio and temperature in the second stage of the drawing defined in operative claim 1 within the measures expected by

the skilled person to lead to an increase of the fibre tenacity (see point 6.2.4 above) have not been shown to be critical in achieving the expected increase of tenacity of the spun fibres.

- 6.2.8 The respondent further submitted that having regard to the drawing ratios described for the first and second drawing stages of the process of D25, namely from 2.6:1 to 3.0:1 and from 3.5:1 to 4.0:1, respectively, the skilled person would be taught away from using the drawing ratio of the second drawing step required by operative claim 1 (rejoinder, section 6.17). It was similarly argued by the respondent that D24 involved a second drawing stage at a temperature from 210 to 250°C which would be much higher than the temperature applied in the second drawing step of the process of operative claim 1 (rejoinder, section 6.16).

This, in the Board's opinion, does not lead away from the solution set out in operative claim 1. This is the case because the skilled person would not blindly follow the values given for some processes used for drawing PET fibres, since the thermal and crystallisation properties of PET and PEF are not stated to be identical and the specific conditions described for the second stage in D24 and D25 obviously also depend on those used for the first drawing stage. The skilled person based on the common general knowledge for PET, i.e. that the drawing of spun fibres induces molecular orientation and crystallinity, would rather apply the same principle and, relying on a reasonable amount of experimentation, would find drawing conditions, which are appropriate to sufficiently increase the tenacity of the PEF spun fibres. Having regard to point 6.2.7 above, it must be concluded that various drawing processes, which are not

limited to those broadly defined in operative claim 1, would in fact allow the skilled person to sufficiently increase the tenacity of PEF fibres.

6.2.9 On that basis, it is concluded that the skilled person wishing to solve the problem defined in point 5 above (a) would have been incited in view of the teaching of paragraph [0151] of D22 and the one of D4 to increase the tenacity of PEF spun fibres by applying measures which for this purpose belong to the common general knowledge regarding PET fibres and (b) would have had no difficulty when putting into practice these measures for PEF to find with a few amount of experimental work an appropriate number of drawing stages, temperatures and drawing ratios for increasing the tenacity of the spun fibres. Consequently, modification (iii) identified in point 4 above is deemed obvious to the skilled person.

6.2.10 Moreover, it has not been submitted that modification (ii), i.e. the range of tenacity values from 200 to 1000 mN/tex according to ISO 5079-1995, results in any technical effect or benefit beyond that expressed by this range of values. Accordingly, the achievement of tenacity values within that range is considered to be the mere result of modification (iii) which does not involve any inventive activity as indicated in point 6.2.6 above. For this reason, modification (ii) does not in the Board's opinion confer an inventive activity either.

6.3 Consequently, starting from the PEF synthesized in examples 5 and 7 of D6 and wishing to provide a process for the preparation of PEF fibres with high tenacity, the skilled person would have been guided by the available prior art to processes that fall within the

ambit of operative claim 1. Accordingly, the subject-matter of present claim 1 which encompasses obvious embodiments does not meet the requirements of Article 56 EPC, and the ground for opposition under Article 100(a) EPC prejudices maintenance of the patent in the form defined in the present main request.

First auxiliary request

Admittance

7. It is undisputed that the first auxiliary request is a new claim request whose filing is to be regarded as an amendment to the appellant's case within the meaning of Article 12(4) RPBA. Its admittance to the proceedings, which is contested by the respondent, is subject to the discretionary power of the Board in accordance with Article 12, paragraphs (4) to (6) RPBA. Its claim 1 corresponds apart from some editorial amendments to claim 1 of the main request with the additional limitation that the molten composition comprises from 75 to 100 %wt PEF, based on the weight of the molten composition. This limitation, which was already present in claim 2 of all previous requests, can be seen to be a legitimate response to an argument of the appellant on pages 14 and 15 of the statement of grounds of appeal, which had not be raised before the opposition division, namely that it is not credible that the technical effect invoked by the respondent is obtained when the fibres comprise a small amount of PEF. Under these circumstances, the Board found it appropriate to make use of its discretionary power under Article 12, paragraphs (4) to (6) RPBA by admitting the first auxiliary request into the proceedings (Article 12(4) and 12(6) RPBA).

Inventive step

8. As indicated in paragraph 7 above, the subject-matter of claim 1 of the first auxiliary request corresponds to that of claim 1 of the main request with the additional requirement that the molten composition comprises from 75 to 100 %wt PEF, based on the weight of the molten composition.

9. The respondent submitted at the oral proceedings that their arguments concerning inventive step of the first auxiliary request were the same as outlined for the main request. They accepted that the amendments comprised in the first auxiliary request had no impact on the assessment of inventive step provided in relation to the main request and its conclusion. Accordingly, claim 1 of the first auxiliary request lacks an inventive step within the meaning of Article 56 EPC and is also not allowable for this reason. In this respect it is noted that the argument of the appellant related to the possible presence of only a small amount of PEF was not considered in the analysis of inventive step for claim 1 of the main request.

Second and third auxiliary requests

Admittance

10. Claim 1 of the second auxiliary request differs from claim 1 of the main request in that the weight average molecular weight of the PEF in the molten composition (in the range of from 65 000 to 180 000) and in the fibre (in the range of from 50 000 to 95 000) is specified. Claim 5 of the second auxiliary request differs from claim 6 of the main request in that the

weight average molecular weight of the PEF in the fibre is defined to be in the range of from 50 000 to 95 000.

These amendments concerning the weight average molecular weight of the PEF in the molten composition and the fibre had already been introduced in opposition with the fourth auxiliary request filed about four months before the oral proceedings before the opposition division. Once it had been decided that the first auxiliary request submitted during the oral proceeding met the requirements of the EPC, there was no need to discuss, let alone to decide upon, the relevance of these additional features for the assessment of inventive step. The significance of these amendments in this respect is addressed in sections 8.6 to 8.8 of the rejoinder.

The second auxiliary request differs from the former fourth auxiliary request as it contains in addition the definition of the method for measuring the tenacity, namely norm ISO 5079-1995. It follows that while the second auxiliary request is formally a new claim request and an amendment to the respondent's case within the meaning of Article 12(4) RPBA, the additional modification was already present in the first auxiliary request underlying the contested decision, i.e. the present main request. This amendment has been submitted and maintained by the respondent in opposition and does not therefore give rise to a new case.

In view of the above, the Board found it appropriate to make use of its discretionary power under Article 12, paragraphs (4) to (6) RPBA by admitting the second auxiliary request into the proceedings (Article 12(4) and 12(6) RPBA).

11. The third auxiliary request differs from the second auxiliary request in that it contains in addition the amendment introduced in the first auxiliary request. The reasons given for admitting the first and second auxiliary request equally apply to the third auxiliary request which therefore was admitted into the proceedings.

Remittal

12. The respondent was in favour of the case be remitted to the opposition division for further prosecution, while the appellant requested that the Board in exercise of its discretion pursuant to Article 111(1) EPC decide on the remaining issues.

Article 11 RPBA provides that the Board shall not remit a case to the department whose decision was appealed for further prosecution, unless special reasons present themselves for doing so. Whether "special reasons" present themselves is to be decided on a case-by-case basis (see explanatory remarks on Article 11 RPBA, Supplementary publication 2, OJ 2020). This provision has also to be read in conjunction with Article 12(2) RPBA, which provides that it is the primary object of the appeal proceedings to review the decision under appeal in a judicial manner.

Whereas inventive step was discussed before the opposition division and decided upon in relation to the features defining the secondary drawing step in order to obtain fibres with tenacity values ranging from 200 to 1000 mN/tex, that decision is not concerned with the use of a PEF having a weight average molecular weight of from 65 000 to 180 000 resulting in a fibre having a

weight average molecular weight of from 50 000 to 95 000. It is the respondent's submission that these weight average molecular weights facilitate obtaining fibres with high tenacity. Reference is made in this context to experimental evidence in the patent (rejoinder, section 8.8). It is undisputed that this aspect of the invention described in the patent in suit requires additional considerations relevant to the issue of inventive step which were not discussed before the opposition division. Moreover, in the appellant's opinion, the amendments concerning the weight average molecular weight of the PEF comprised in the molten composition to be spun and the one of the PEF comprised in the fibre after drawing are not only unsuitable to overcome the inventive step objection, but result in additional deficiencies under Articles 123(2), 84 and 83 EPC (letter of 12 May 2022, sections III.2, III.3 and III.4).

This situation, which results in a fresh case before the Board, is seen to constitute "special reasons" within the meaning of Article 11 RPBA to remit the case for further prosecution to the department whose decision was appealed.

Accordingly, exercising its discretion under Article 111(1), second sentence, EPC, the Board decides to remit the case to the opposition division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division for further prosecution.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated