

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

**Datasheet for the decision
of 10 August 2006**

Case Number: T 0291/03 - 3.3.09

Application Number: 95300131.0

Publication Number: 0663286

IPC: B32B 2/36

Language of the proceedings: EN

Title of invention:

Biaxially oriented laminated polyester film

Patentee:

TEIJIN LIMITED

Opponents:

Mitsubishi Polyester Film GmbH
Toray Industries

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 83, 123(2)

Keyword:

"Main request: inventive step (no)"

"Auxiliary request IX: added subject-matter (no), novelty,
inventive step, sufficiency of disclosure (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0291/03 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 10 August 2006

Respondent: TEIJIN LIMITED
(Patent Proprietor) 6-7, Minamihonmachi 1-chome
Chuo-ku
Osaka-shi
Osaka 541-0054 (JP)

Representative: Cockerton, Bruce Roger
Carpmaels & Ransford
43, Bloomsbury Square
London WC1A 2RA (GB)

Appellant: Toray Industries, Inc.
(Opponent 02) 2-1 Nihonbashi Muromachi 2-chome
Chou-ku, Tokyo 103 (JP)

Representative: Kador & Partner
Corneliusstraße 15
D-80469 München (DE)

Other Party: Mitsubishi Polyester Film GmbH
(Opponent 01) Rheingaustraße 190-196
D-65203 Wiesbaden (DE)

Representative: Schweitzer, Klaus
Zounek Plate Schweitzer
Patentanwaltskanzlei
Rheingaustraße 196
D-65203 Wiesbaden (DE)

Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office orally
announced 26 November 2002 and posted
28 January 2003 concerning maintenance of
European patent No. 0663286 in amended form.

Composition of the Board:

Chairman: P. Kitzmantel
Members: W. Ehrenreich
W. Sekretaruk

Summary of Facts and Submissions

- I. Mention of the grant of European patent No. 0 663 286 in respect of European patent application No. 95 300 131.0, filed on 10 January 1995 in the name of *Teijin Limited*, was announced on 16 September 1998.

The patent, entitled "*Biaxially oriented laminated polyester film*" was granted with seven claims, Claims 1, 2 and 5 reading as follows:

"1. A biaxially oriented, laminated polyester film comprising a polyester substrate layer (A) and a polyester surface layer (B) laminated on at least one surface of the polyester substrate layer (A), the polyester surface layer (B) (1) containing inert particles, (2) having a thickness of 0.02 to 3 μm , (3) having a surface roughness Ra of 3 to 40 nm and (4) having a surface roughness fluctuation ratio of 5% or less when measured along a distance of 500 mm in the film width direction, the Ra fluctuation ratio being defined as

$$\text{Ra fluctuation ratio} = \frac{\text{Ra}(\text{Max}) - \text{Ra}(\text{Min})}{\overline{\text{Ra}}} \times 100$$

wherein Ra(Max) is the largest value of Ra, Ra(Min) is the smallest value of Ra and $\overline{\text{Ra}}$ is the average value of Ra(Max) and Ra(Min)."

"2. The biaxially oriented, laminated polyester film according to claim 1, wherein the thickness of the surface layer (B) is increased in the film width

direction with an increase in the birefringence (Δn) which is the difference between the refractive index (n_{MD}) in the longitudinal direction and the refractive index (n_{TD}) in the width direction of the surface layer (B)."

"5. The biaxially oriented, laminated polyester film according to claim 2, wherein the orientation angle in a position A' on the surface layer (B) where the orientation angle measured in the film width direction is the smallest, the orientation angle in a position B' on the surface layer (B) where the orientation angle measured in the film width direction is the largest, the thickness of the surface layer (B) and the distance between the above two positions satisfy the following relationship (4),

$$\frac{\theta_{B'} - \theta_{A'}}{9,000} \times L' \leq \frac{t_{B'} - t_{A'}}{t_{A'}} \leq \frac{\theta_{B'} - \theta_{A'}}{0.9} \times L' \quad (4)$$

wherein $t_{A'}$ is the thickness (μm) of the surface layer (B) in the position A', $t_{B'}$ is the thickness (μm) of the surface layer (B) in the position B', $\theta_{A'}$ is the orientation angle ($^\circ$) in the position A', $\theta_{B'}$ is the orientation angle ($^\circ$) in the position B', L' is the distance between the position A' and the position B', and the orientation angle is defined as the angle formed by the longitudinal direction of the film and the orientation direction of the film."

Claims 3 and 4 are dependent on Claim 2, Claim 6 is dependent on Claim 1 and Claim 7 is directed to the use of the film of Claims 1 to 6 for a magnetic recording tape.

II. Notices of opposition requesting revocation of the patent in its entirety were filed by

Mitsubishi Polyester Film GmbH - Opponent I on 16 June 1999

and

Toray Industries Inc. - Opponent II on 15 June 1999.

The opponents based their oppositions on the grounds according to Articles 100(a) (lack of novelty and lack of inventive step), 100(b) and 100(c) EPC (lack of a basis in the application as filed for the back reference in Claim 5 to Claim 2) and cited the following documents in support of the objections under Article 100(a):

D1 EP-A 0 562 486

D1a Declaration of Mr Y Sato filed by Opponent I with the letter of 18 June 1999

D2 EP-A 0 522 412

D3 JP-A 3-209 624

D4 English translation of D3 filed by Opponent II with the letter dated 15 June 1999

D4a Experimental report filed by Opponent II with the letter dated 15 June 1999

D4b Experimental report filed by Opponent II with the letter of 25 October 2002

D5 JP-A 3-207 727

- D6 English translation of D5 filed by Opponent II with the letter of 25 October 2002
- D7 JP-A 63-126 723
- D8 English translation of the claims of D7 filed by Opponent II with the letter of 25 October 2002.

III. In the oral proceedings held on 26 November 2002, the Patent Proprietor filed a set of Claims 1 to 7 as a basis for an auxiliary request I which differed from the claims as granted only in Claim 5 by the insertion of the passage "*wherein the film width is 2000 mm or less, and*" between "... according to claim 2," and "wherein the orientation angle ...". Claim 5 of this request read as follows:

"5. The biaxially oriented, laminated polyester film according to claim 2, wherein the film width is 2000 mm or less, and wherein the orientation angle in a position A' on the surface layer (B) where the orientation angle measured in the film width direction is the smallest, the orientation angle in a position B' on the surface layer (B) where the orientation angle measured in the film width direction is the largest, the thickness of the surface layer (B) and the distance between the above two positions satisfy the following relationship (4),

$$\frac{\theta_{B'} - \theta_{A'}}{9,000} \times L' \leq \frac{t_{B'} - t_{A'}}{t_{A'}} \leq \frac{\theta_{B'} - \theta_{A'}}{0.9} \times L' \quad (4)$$

wherein $t_{A'}$ is the thickness (μm) of the surface layer (B) in the position A', $t_{B'}$ is the thickness (μm) of the surface layer (B) in the position B', $\theta_{A'}$ is the

orientation angle ($^{\circ}$) in the position A', θ_B is the orientation angle ($^{\circ}$) in the position B', L' is the distance between the position A' and the position B', and the orientation angle is defined as the angle formed by the longitudinal direction of the film and the orientation direction of the film."

With the interlocutory decision orally announced in the oral proceedings and issued in writing on 28 January 2003 the Opposition Division maintained the patent on the basis of this auxiliary request I which was considered to comply with the requirements of Articles 123 (2), 83, 54 and 56 EPC.

Concerning the opposition ground of Article 100(c) EPC, the Opposition Division accepted in its decision that the back-reference of Claim 5 to Claim 2 met the requirements of Article 123(2) EPC. It was argued that a link was derivable from the application as filed between the thickness variation of the surface layer according to Claim 2, the film width of 2000 mm or less and the numerical relationship (4) concerning the orientation angle according to Claim 5.

The Opposition Division also accepted that the disclosure of the invention was sufficient in accordance with Article 83 EPC, because the skilled person would understand that the thickness of the surface layer (B) was applicable to any position of the film and because it was not a problem to measure the maximum and minimum roughness values at any two positions 500 mm apart in the width direction, and thus to arrive at the required surface roughness fluctuation.

With regard to the opposition grounds according to Article 100(a) EPC the Opposition Division held that D1 and D4 were not novelty destroying because the reworking of experiments D1a and D4a/b did not establish that the disclosure of these documents inevitably led to the claimed films.

Furthermore, a combination of D1 with D2 would not suggest the claimed set of features, in particular the required limit of the surface roughness fluctuation.

IV. On 10 March 2003 the Opponent II (Toray Industries, Inc., hereinafter the Appellant) lodged an appeal against the decision of the Opposition Division and paid the prescribed fee on the same day. The Statement of the Grounds of Appeal was submitted on 26 May 2003.

The Appellant maintained its objections as to added subject-matter, insufficiency of disclosure, lack of novelty and lack of inventive step raised in the first instance opposition proceedings and introduced for the first time the documents

D9 JP-B 5-58383 as English translation, examined version of JP-A 63-126723 (D7)

D10 P. Mapleston, Modern Plastics International, June 1990, pages 38 to 41

D4c Experimental report established by Mr Akira Otonashi, concerning reworking of the examples 1 to 4 of D3/D4.

V. In response to the Appellant's Statement, the Respondent (Patent Proprietor) defended, as a main request, the maintenance of the patent on the basis of the set of claims underlying the appealed decision

(then auxiliary request I) and filed with the letter dated 8 October 2003 ten amended sets of claims as bases for new auxiliary requests I to X.

In the oral proceedings held on 10 August 2006, the Respondent presented a copy of the letter dated 12 February 1997 sent to the Examining Division during the examination proceedings. This letter - *hereinafter referred to as D11* - contains a test report performed by the Respondent (then Applicant) concerning the reproduction of the example 1 of D1.

During the oral proceedings, the Respondent withdrew the auxiliary requests I to VIII. Claim 1 of the auxiliary request IX, which is a combination of Claims 1 and 2 of the main request, reads as follows:

"1. A biaxially oriented, laminated polyester film comprising a polyester substrate layer (A) and a polyester surface layer (B) laminated on at least one surface of the polyester substrate layer (A), the polyester surface layer (B) (1) containing inert particles, (2) having a thickness of 0.02 to 3 µm, (3) having a surface roughness Ra of 3 to 40 nm and (4) having a surface roughness fluctuation ratio of 5% or less when measured along a distance of 500 mm in the film width direction, the Ra fluctuation ratio being defined as

$$\text{Ra fluctuation ratio} = \frac{\text{Ra}(\text{Max}) - \text{Ra}(\text{Min})}{\overline{\text{Ra}}} \times 100$$

wherein $Ra(\text{Max})$ is the largest value of Ra , $Ra(\text{Min})$ is the smallest value of Ra and \overline{Ra} is the average value of $Ra(\text{Max})$ and $Ra(\text{Min})$; and wherein the thickness of the surface layer (B) is increased in the film width direction with an increase in the birefringence (Δn) which is the difference between the refractive index (n_{MD}) in the longitudinal direction and the refractive index (n_{TD}) in the width direction of the surface layer (B)."

VI. The arguments of the Appellant and the Opponent I presented in oral and written form can be summarised as follows:

(a) *Article 123 (2) EPC*

Claim 5 of the main request referred back to Claim 2 and therefore combined the features of the relationship (4) concerning the orientation angle θ and the film thickness at certain positions of the film with the relationship concerning the increase of the birefringence Δn and the increase of the film thickness in the film width direction according to Claim 2.

No basis existed in the application as filed for such a dependency because original Claim 5 was only dependent on original Claim 1.

There was also no disclosure to be found in the original description for the mutual dependency of the birefringence, the orientation angle and the Ra fluctuation. The wording in page 6, line 47 "*according to another aspect of the invention ...*" in context with the equation (4) implied that the

orientation angle/thickness relationship should be considered separately.

The back-reference in Claim 5 to Claim 2 of the main request, therefore, contravened Article 123(2) EPC.

(b) *Article 83 EPC*

There was no guidance in the patent specification as to how to obtain a film with the Ra fluctuation ratio as claimed in Claims 1 of the main request and the auxiliary request IX.

Firstly, the positions A and B, relative to the film edge, between which the distance of 500 mm was to be determined, were not stated. Secondly, it was not indicated by how much or where the film thickness should be varied as a function of the increase of the birefringence values in order to arrive at the required Ra fluctuation ratio.

The four-step process for putting the invention into effect as suggested by the Respondent at page 3, point 9, of the letter dated 8 October 2003 was not part of the teaching of the patent. It was furthermore doubtful that a correlation between the film thickness and the birefringence existed because the film according to comparative example 1 of the patent specification had, at an equal thickness in positions A and B of the film, different values for the birefringence Δn .

Therefore, the disclosure of the patent put an undue burden on a skilled person trying to carry out the invention.

(c) *Novelty*

As documented by the experimental reports D4a to c, the examples 1 to 4 of D4 were reworked. Biaxially oriented films of respectively 4000 mm (D4a) and 4500 mm (D4b) width were prepared and the Ra fluctuation was measured along a distance of 500 mm in the width direction of the resulting film. Although the film width was not defined in D4, it had to be assumed that for films designated for the manufacture of magnetic recording tapes, a film width of considerably above 500 mm is common because such films are slit along the longitudinal axis. In particular, D10 showed that in the manufacture of biaxially oriented film on an industrial scale, film widths up to 8000 mm are usual.

The results shown in D4a,b and summarised in table D4c showed that the films reworked in accordance with examples 1 to 4 of D4 satisfied the requirements of Claim 1 according to the main request with respect of the surface layer thickness, the surface roughness and the surface roughness fluctuation. D4 was therefore novelty destroying for the subject-matter claimed according to the main request.

The same applied to the subject-matter of auxiliary request IX because the feature *that the*

thickness of the surface layer B is increased in the film width direction with an increase in the birefringence Δn was a product-by-process feature which was not detectable on the claimed film itself.

Likewise, the film described in example 1 of D1 was reproduced and the results were depicted in the experimental report D1a. The reworked film which had a width of 4500 mm was slit both at the center and a position 1000 mm away from the center in accordance with the advice given in the letter dated 11 June 1996 submitted by the Respondent in the examination proceedings. The Ra fluctuation ratio of the slit films was found to be zero at any position in the film width direction, i.e. within the range of $\leq 5\%$ as required in the main request and auxiliary request IX. Therefore, D1 was also novelty destroying for the claimed subject-matter.

(d) *Inventive step*

The closest prior art was represented by D4 pertaining to films for video tapes. The requirement of a certain surface roughness Ra of the base film was disclosed at page 3 as well as the preparation of wide films which were slit "to form a pancake" (page 14).

The claimed film essentially differed therefrom by its characterisation via the surface roughness fluctuation ratio.

However, it belonged to the common general knowledge that good running properties of videotapes required a uniform roughness, i.e. a low surface roughness fluctuation, over the whole surface of the base film.

D9 dealt with the problem of reduced slip properties in films with a large width due to surface unevenness caused by biaxially stretching the films on wide drawing machines. As a solution to this problem it was suggested that the haze uniformity of the film, which was a measure for surface unevenness, should be controlled via the concentration of the inorganic particles at the center and the edge portions of the film width. It was further stated in D9 that the above correction effect via the haze could be enhanced by variation of the surface layer thickness because the surface unevenness caused by the protrusion of inorganic particles was found to be thickness dependent. This implied that surface roughness uniformity, for which haze was also a measure, could be controlled over the variation of the film thickness.

Thus, a skilled person would arrive at the film according to Claim 1 of the main request and the auxiliary request IX without an inventive effort by combining D4 with D9.

In a similar manner, D1 related to the improvement of the surface smoothness of magnetic recording tapes by means of films containing particulate material, so as to maintain good tape runnability.

The problem underlying the subject-matter of D1 was the same as that of the patent and was a general desire in this technology. The provision of films with a low surface roughness fluctuation ratio as claimed in Claim 1 was therefore obvious for a skilled person starting from D1 and wishing to realise this desire.

VII. The arguments of the Respondent provided orally and in written form can be summarised as follows:

(a) *Article 123(2) EPC*

The relation between the film thickness, the orientation angle and a limited film width up to 2000 mm was derivable from page 6, lines 47 to 49 of the patent specification.

The back-reference of Claim 2 to Claim 1 in the context of the disclosure at page 5, lines 10 to 14 and 22 to 30 of the patent specification implied that the variation of the film thickness dependent upon the variation of the birefringence Δn was valid for all films according to the invention. There was no indication in the application as filed that the relationship between film thickness and birefringence and between film thickness and orientation angle were independent concepts of the invention. This all the more so as in the examples 7 to 11 of the patent, where both the birefringence and the orientation angle are determined for the same film, the same tendency for the change of these parameters with the change of the film thickness is seen.

(b) *Article 83 EPC*

The equation (1) according to Claim 3 of the main request enabled a skilled person to calculate, on the basis of the measured birefringence of a test film, the threshold within which the film thickness during the film preparation was to be changed (by adjusting the slit gap of the coextrusion die) in order to arrive at films with the Ra fluctuation ratio as claimed in Claim 1. This was unambiguously disclosed in the patent specification at page 8, lines 5 to 11 in context with page 7, lines 43 to 46.

With regard to the disclosure in page 5, lines 15 to 22, it was also clear to a skilled person that the relationship between the birefringence and the degree of adjustment of the film thickness was not fixed and had to be determined in advance by experiment.

This disclosure led the skilled person to the four-step procedure as submitted with the letter dated 8 October 2003, as follows:

- (i) an initial test run to produce a filled layered film with uniform surface layer thickness in accordance with comparative example 1;
- (ii) measurement of refractive index in order to determine the maximum and minimum birefringence at positions A and B over the film width;

- (iii) use of equation (1) in order to determine the range within which the film thickness should be varied over the film width;
- (iv) start of the film manufacture using an extrusion die with a variable slit gap in order to adjust the thickness over the film width by increasing it at the position where the measured birefringence has the maximum value.

In principle the same applied, with respect to the equation (4), with the thickness adjustment via the measurement of the orientation angle θ .

The film according to example 1 of the patent specification with a lower surface layer thickness at the central position A (corresponding to a lower birefringence measured at this position) and a higher thickness at the edge position B (corresponding to a higher birefringence measured at this position) clearly demonstrated that the slit gap characteristic of the extrusion die had to have a concave structure in order to arrive, after stretching of the coextruded film, at the surface roughness fluctuation required in Claim 1.

Although the disclosure of the invention did not mention exact thickness/birefringence relationships which would immediately lead to the required low surface roughness fluctuation, the guidance as to how and where to change the film thickness in order to arrive at the claimed films was clearly disclosed. It was therefore possible for a skilled person wishing to perform the

invention to transform a certain number of failures into satisfactory results.

Because, according to the established case law of the boards of appeal, a reasonable amount of trial and error was permissible, the correct adjustment of the slit gap of the die on the basis of the disclosed thickness/birefringence relationship did not amount to an undue burden.

The requirements of Article 83 EPC were therefore fulfilled.

(c) *Novelty*

The test reports D4a to c did not constitute a fair reproduction of the examples 1 to 4 of D4. According to the disclosure at page 22 of D4, the particulate material incorporated into the surface layer of the film was a composition comprising crosslinked polystyrene particles and silica particles. Such a mixture of particles, however, had not been used according to the test reports D4a to c, which only indicated colloidal silica as particulate material. The reworked films showing a surface roughness fluctuation falling within the claimed range did therefore not represent films according to the teaching of D4.

Consequently, D4 was not novelty-destroying for the claimed subject-matter.

Contrary to the results depicted in the test report D1a showing that the reworked film of example 1 of D1 had a surface fluctuation ratio of zero over the whole film width of 1000 mm, the

Respondent's own report D11 on the reproduction of the same film of D1 showed in table 1 that the surface roughness of the reworked film was 16.7% along a distance of 500 mm, i.e. far outside the claimed film.

The novelty destroying character of D1's disclosure was therefore questionable.

(d) *Inventive step*

The problem to be solved by the claimed invention was the provision of laminated polyester films for magnetic recording tapes having a surface roughness appropriate to conform to a high take-up rate and an excellent roll-up quality producing no bumps. According to the invention, it had been found that the optimization of the surface roughness fluctuation ratio of the polyester surface layer overcomes the problems of corresponding films of the prior art, i.e. insufficient take-up rate in a good rolled form.

None of the prior art documents addressed the solution to this problem according to the teaching of the patent.

D4 pertained to video tapes with good output characteristics after repeated recording and a high signal-to-noise (S/N) ratio. There was no indication in D4 which would motivate the skilled person to solve the problem posed via the minimisation of the surface roughness fluctuation. A skilled person would also not combine D4 with D9 which related to the improvement of the haze of

films for packaging and industrial purposes and was unrelated to the problems of video tapes.

Likewise, D1 addressed the problem of runnability of video tapes in a more general way and not in the specific form according to the patent. There was no indication in D1 that the problem posed could be solved by a widthwise variation of the roughness of the surface layer in order to optimize the surface roughness fluctuation ratio as claimed.

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

This was also the request of Opponent I.

IX. The Respondent requested that the appeal be dismissed and that the patent be maintained on the basis of auxiliary request I of 26 November 2002 as main request, or on the basis of auxiliary requests IX and X filed on 8 October 2003.

Reasons for the Decision

1. The appeal is admissible.

Main Request

2. Inventive step

2.1 The subject-matter of the patent in suit

The patent in suit concerns biaxially oriented laminated polyester films which are suitable as base layer for magnetic recording tapes and have the following properties:

- uniform surface roughness in the width direction;
- excellent take-up properties resulting in excellent roll quality;
- suitable for the formation of pancakes of a plurality of slit films in the form of rolls free of side surface non-uniformity and bumps;

cf. patent specification, page 2, lines 18/19 and page 3, lines 20 to 26.

According to Claim 1 of the main request, the surface layer (B) of the laminated film is characterised by the content of inert particles, a thickness of 0.02 to 3 μm , a surface roughness Ra of 3 to 40 nm and a surface roughness Ra fluctuation ratio, defined by the equation, of 5% or less.

2.2 The closest prior art

D1 is representative of the closest prior art. This document relates to biaxially stretched laminated polyester films for magnetic tapes having a base layer B (corresponding to the base layer A according to the film of the invention) and a surface layer A (corresponding to the surface layer B of the invention); cf. D1, page 3, lines 8 to 13 and page 5, line 54. According to D1, the surface layer contains inert particles, has a thickness of 0.1 to 5 μm , preferably 0.5 to 4 μm , and a surface roughness Ra of 0.005 to 0.040 μm , corresponding

to 5 to 40 nm (D1, page 4, lines 19 to 30). The ranges for the thickness and the surface roughness disclosed in D1 overlap with the corresponding values indicated in Claim 1 of the main request under (2) and (3).

2.3 Problem and solution

The film of the invention differs therefrom essentially in that the surface roughness Ra fluctuation ratio, when measured along a distance of 500 mm in the film width direction, is 5% or less. Such a parameter is not defined in D1.

The examples 1 to 11 provided in the patent specification demonstrate an improved take-up property (excellent rolled form: evaluation AA; or excellent rolled form under specific conditions: evaluation A, cf. page 9, lines 21 to 27 of the description) for films with surface roughness values at positions A and B from which an Ra fluctuation ratio of 5% or less as claimed can be calculated according to the equation indicated in Claim 1. In comparison thereto, the films of comparative examples 1 and 2 with an Ra fluctuation ratio outside the claimed range show reduced take-up properties with the evaluation C for the rolled form according to page 9, lines 32 to 34 (no excellent rolled form obtainable).

Therefore, the problem to be solved by the invention is seen in the provision of polyester films for magnetic tapes with an improved high quality take-up rate leading to an excellent rolled form over the film width.

2.4 Obviousness

Good running and take-up properties leading to a high roll quality are undoubtedly highly-desired quality criteria for polyester base films suitable for magnetic tapes.

According to the teaching in D1, page 2, the following relations between the property of the film surface and runnability/winding up property of the film are relevant:

- the surface of flat base films for magnetic tapes should be as smooth as possible (lines 14 to 16);
- surface roughness on the film surface is necessary for good slip properties so as to improve runnability/winding property during winding up the film (lines 17 to 20) and
- high quality base films for magnetic tapes have to fulfil the requirements of improved surface smoothness while maintaining good runnability (lines 21 to 24).

By this disclosure, the skilled person is guided to provide an even roughness on the film surface in order to positively influence the film runnability and winding properties, the latter necessarily leading to a high roll quality of the wound film.

A skilled person, being aware of D1 and intending to solve the problem posed is therefore motivated to incorporate particles into the surface layer of the film in such a way that the resulting surface roughness is as even as possible over the film width.

It is common in the prior art (cf. D10) to manufacture films in the form of very broad webs, equal to or

exceeding 500 mm, and then - for the purpose of preparing magnetic tapes - to slit the films lengthwise to the desired width to form a number of tapes, e.g. video tapes with a width of 1/2 inch as indicated in D1 at page 7, lines 21 to 23. From this it follows immediately for a skilled person that the surface roughness must be as uniform as possible over the whole width of the initial un-slit web in order to guarantee roughness uniformity after slitting for all tapes in the widthwise direction. High roughness uniformity of the webs, however, means a very low deviation between the highest and the lowest roughness values, i.e. a very low fluctuation ratio along the whole distance in the film width direction. Of course, such a fluctuation ratio should be ideally zero.

The feature (4) of Claim 1 of the main request therefore merely defines a surface roughness fluctuation ratio ranging from the ideal value of zero to a very low upper limit of 5% along an arbitrary distance of 500 mm. In the light of D1, however, this does not involve an inventive step.

Therefore the main request is not allowable.

Auxiliary request IX

In addition to Claim 1 of the main request, Claim 1 of the auxiliary request IX, which is a combination of granted Claims 1 and 2, defines an increased thickness of the surface layer (B) in the film width direction, accompanied by an increase of the birefringence Δn .

3. Article 123(2) EPC

In the written and oral submissions, the Appellant and the Opponent I raised objections as to the back reference in Claim 5 to Claim 2 of the main request, which was originally only dependent on Claim 1. Because, according to auxiliary request IX, the features of Claim 2 are now part of amended Claim 1, these objections now apply to amended Claim 1 and the back reference in Claim 5, now renumbered to read Claim 4, is now directed to amended Claim 1 of the auxiliary request IX. In this respect, it has to be considered whether a relationship between the orientation angle according to Claim 4 and the increased thickness with an increase of the birefringence is derivable from the application as filed.

The Board agrees with the argument of the Respondent that the dependency of Claim 2 on Claim 1 in the application as filed signified that the relationship between the thickness of the surface layer (B) and the increase in birefringence should apply to all films having the properties defined in Claim 1.

The same applies to the relation between the orientation angle θ and the layer thickness according to Claim 5, which was also originally dependent on Claim 1.

It is therefore within the disclosure in the application as filed that the thickness of the surface layer (B) according to Claim 1 is related to the birefringence Δn as well as to the orientation angle θ . From the equation (4) given in Claim 4 the same tendency as defined in Claim 2 can be inferred, i.e. that an increased layer thickness also means an

increase of the orientation angle. This is in addition confirmed by the examples 7 to 11.

Hence, both relationships are to be considered in the same context and are not - as alleged by the Respondent and Opponent I - mutually exclusive aspects of the invention. Back-reference in Claim 5 to Claim 2 or, as in the auxiliary request IX, back-reference in Claim 4 to the combined Claims 1 and 2 does therefore not constitute added subject-matter contrary to Article 123(2) EPC.

4. Sufficiency of disclosure - Article 83 EPC

In this context, the question arises whether a skilled person is able to prepare films with the required Ra fluctuation ratio of 5% or less without an undue burden on the basis of the relationship, which is indicated in the patent specification, between the thickness and the birefringence of the surface layer (B).

In this respect, the passages in the patent specification at page 5, lines 15 to 21, page 8, lines 5 to 7 and 8 to 11 and page 7, lines 43 to 46, referred to by the Respondent in the oral proceedings, in combination with the disclosure at page 5, lines 10 to 14, are crucial.

From the first passage at page 5, the skilled person intending to perform the claimed invention and to find a suitable polyester/particle combination in the surface layer (B) of the film learns that preliminary tests have to be done in order to determine the relation between the layer thickness and the corresponding birefringence values before suitable

conclusions for the adjustment of the Ra values can be drawn.

The passage at page 8 informs the skilled person that the measured birefringence values at certain positions in the width direction of the surface layer (B) are the basis for varying the layer thickness by adjusting the gap of the orifice slit through which the molten polyester to form the surface layer (B) is coextruded.

The alteration of the slit gap in the width direction before the polymer for the surface layer (B) is coextruded is indicated in the passage at page 7. The instruction in the second passage of page 5, namely to decrease the Ra fluctuation ratio through an increased thickness of the surface layer (B) at a position where the birefringence is increased, complements the instructions.

In the Board's judgment, the skilled person wishing to put the claimed invention into practice can derive the following directives from the above information:

- (a) determine the relation between birefringence and layer thickness by a preliminary test; this means that a test film has to be prepared; this test film, like for instance that of comparative example 1, has of course not yet been adjusted as regards the thickness of the surface layer (B).
- (b) measure the birefringence at certain positions of the surface layer (B) of the test film in order to obtain information as to where the birefringence shows increased values relative to other positions;

- (c) prepare a film in the sense of the teaching of the patent by increasing, during extrusion of the polymer for the surface layer (B), the thickness of the layer at the positions determined in (b) by adjusting the gap of the orifice slit, in order to optimize the Ra fluctuation ratio;
- (d) determine the Ra fluctuation ratio obtained on the stretched film and draw the necessary conclusions imposed by the attained change of this ratio in relation to the slit width adjustment performed.

Although, as admitted by the Respondent in the oral proceedings, step (c) does not immediately lead to a film with the claimed Ra fluctuation ratio, it follows from the above that sufficient guidance is provided in the patent specification to arrive, by trial and error, at the claimed films via the stepwise adjustment of the layer thickness according to step (c). This all the more so, as the skilled person can further refer to the equation (1) from which he can calculate the threshold $(t_B - t_A)/t_A$, on the basis of the difference in birefringence at the layer positions A and B, within which the film thickness has to be varied.

In the light of the above information and under the assumption that the normal stretch conditions for preparing stretched polyester films suitable as base layer for magnetic recoding tapes are known to a skilled person, the Board accepts that the biaxially oriented film according to the invention can be prepared without an undue burden.

The requirements of Article 83 EPC are therefore fulfilled.

5. Novelty

In the context of novelty, it has in particular to be assessed whether the films described in the example 1 of D1 and the examples 1 to 4 according to D4 inherently possess an Ra fluctuation ratio as claimed in Claim 1.

5.1 Novelty over D1

The result of the experimental report D1a concerning the reproduction of the film of example 1 of D1 and showing a surface roughness fluctuation ratio of 0% at any position along the film width was contested by the Respondent.

An own test report D11 concerning a reworking of example 1 of D1 was submitted in the oral proceedings. This report was already present in the examination file and had been submitted to the Examining Division with the letter of 12 February 1997. A highly deviating Ra fluctuation ratio of 16.7% for the reworked film is depicted in Table 1, which ratio is far outside Claim 1 of the auxiliary request IX and completely at variance with the alleged absence of any surface roughness fluctuation according to the Respondent's test report D1a.

The Board cannot decide in favour of or against the possibly novelty-anticipating character of example 1 of D1 on the basis of the arguments and counterarguments put forward in the oral proceedings as to the correctness or not of the respective reproductions of example 1 of D1 by either the Opponent I (D1a) or the

Respondent (D11). Because, however, in opposition proceedings the burden of proof lies with the Appellant/Opponent I, the Respondent has to be given the benefit of the doubt, with the consequence that the novelty-anticipating character of example 1 of D1 is not considered to be established to the required certainty (cf. Case Law of the Boards of Appeal, 4th ed. 2001, section 6. Burden of proof, page 360).

5.2 Novelty over D4

In order to demonstrate the novelty destroying disclosure in D4, the test reports D4a to D4c were provided by the Appellant. These experiments, however, suffer from the deficiency that, in reworking the examples 1 to 4 of D4, only one particulate material in the form of colloidal silica has been incorporated into the surface layer of the polyester films (cf. D4a, page 1, lines 1 to 3 of the first paragraph and the table; D4b, the tables 1/2 at pages 11/12; D4c, row 6 from the bottom of the table).

In contrast thereto, however, the examples 1 to 4 of D4 prescribe the use of a mixture of crosslinked polystyrene particles and silica particles derived from colloidal silica (D4, page 22, lines 1 to 4 below "Examples 1 to 4 and Comparative 1 to 4").

The Board, therefore, cannot agree with the Appellant that D4a to D4c represent a fair reworking of the examples of D4.

This conclusion is not changed by the Appellant's argument put forward in the oral proceedings, that the total particle concentration - which was in D4a to D4c

comparable with that of the examples of D4 - and not the nature of the particles was the parameter crucial for influencing the roughness of the layer surface. With respect to the further disclosure in the above passage in D4, namely that the crosslinked polystyrene particles and the colloidal silica particles have different particle size diameters, it has to be assumed - unless the contrary is proven, which the Appellant, however, has failed to do - that crosslinked polystyrene and colloidal silica particles, due to their different particle diameters, contribute differently to the roughness of the surface layer in the polyester film.

The Board therefore takes the position that D4a to D4c do not represent a fair reworking of the examples of D4. The Appellant has therefore not provided sufficiently convincing evidence that the films of examples 1 to 4 destroy the novelty of the claimed subject-matter, notwithstanding the identity of the surface roughness fluctuation ratio between the films of the claimed invention and those described in D4a to D4c.

Because, as not contested by the Appellant and the Opponent I, the other documents cited do not expressly disclose films with the properties as claimed in Claim 1, the subject-matter of the auxiliary request IX is novel over the prior art.

6. Inventive step

In addition to the main request, the film according to Claim 1 of the auxiliary request IX is further characterised by an increased thickness of the surface

layer (B) in the film width direction with an increase in the birefringence Δn .

As confirmed by the Respondent in the oral proceedings, the wording in Claim 1 "wherein the thickness of the surface layer (B) is increased in the film width direction ...", on its linguistically proper interpretation, defines a film property (thickness increase) by way of a product feature and not a product-by-process feature; the term "is increased" is to be understood as referring to the thickness property of the film itself and does not designate an action to be performed for its production.

The Board is therefore satisfied by the Respondent's explanation with respect to the examples of the patent specification, that the surface layer of the claimed film has an increased thickness in the edge portion, where the Δn value shows an increase (position B), and a decreased thickness in the center portion (position A), where the Δn value is lower, i.e. that the film possesses a concave profile.

6.1 The closest prior art, the problem to be solved and its solution.

The closest prior art is again represented by D1, cf. point 2.2, or alternatively by D4, also lying in the technical field of magnetic recording media and pertaining to the adjustment of the surface roughness.

The subject-matter of the auxiliary request IX differs therefrom by a concave thickness profile of the surface layer (B) with a gradient in birefringence values depending on the layer thickness.

The problem to be solved by the invention is therefore seen in the provision of a biaxially oriented polyester film having a surface layer roughness whose evenness in the width direction is optimized.

As set out in Claim 1, the solution to this problem resides essentially in adjusting the thickness of the surface layer of the film in its width direction in parallel with the degree of birefringence (Δn)."

6.2 Obviousness

Although D1 pertains to the improvement of the surface smoothness of polyester films for magnetic tapes via adjustment of the surface roughness, the document does not indicate or suggest that a relation exists between surface roughness fluctuation ratio, surface layer thickness and certain optical properties of the layer.

The same considerations principally apply to D4.

Therefore, a skilled person intending to solve the problem posed would not be motivated to adjust the widthwise profile of the surface layer by increasing its thickness at surface positions where the measured birefringence values are increased in order to arrive, on the basis of these results, at a decreased surface roughness fluctuation ratio.

The claimed invention is therefore not rendered obvious by either D1 or D4.

Document D9, differently from the invention, teaches that one can influence the surface evenness/haze over the film width resulting from a different drawing pull in the central and lateral film portions by a relative increase of the thickness in the center portion of the extruded film. This in turn can be achieved by an appropriate variation of the polymer extrusion rates across the extrusion die (page 7, 3rd paragraph to page 8, penultimate paragraph; example 2). Apart from this teaching, which is entirely different from that of the claimed invention, D9 is also not related to the problems of magnetic recording tapes. Rather, it pertains to the improvement of haze in films suitable for packaging and industrial purposes. For these reasons, it cannot contribute to the solution to the problem posed.

A combination of either D1 or D4 with D9 would therefore also not lead to the claimed invention.

7. From points 3 to 6 it follows that none of the opposition grounds prejudices the maintenance of the patent on the basis of auxiliary request IX.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The European patent is maintained on the basis of Claims 1 to 6 of auxiliary request IX filed 8 October

2003 after any necessary consequential amendment of the description.

The Registrar

The Chairman

G. Röhn

P. Kitzmantel