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**Datasheet for the decision  
of 07 April 2009**

**Case Number:** T 0513/06 - 3.3.09

**Application Number:** 97300355.1

**Publication Number:** 0786765

**IPC:** G11B 5/733

**Language of the proceedings:** EN

**Title of invention:**

Biaxially oriented laminate polyester film

**Patentee:**

TEIJIN LIMITED

**Opponent:**

Toray Industries, Inc.

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56

**Relevant legal provisions (EPC 1973):**

-

**Keyword:**

"Inventive step (no)"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0513/06 - 3.3.09

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.09  
of 07 April 2009

**Appellant:**

(Patent Proprietor)

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**Respondent:**

(Opponent)

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**Representative:**

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**Decision under appeal:**

Decision of the Opposition Division of the  
European Patent Office orally announced  
20 December 2005 and posted 25 January 2006  
revoking European patent No. 0786765 pursuant  
to Article 102(1) EPC.

**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. 0 786 765 in respect of European patent application No. 97 300 355.1 filed on 21 January 1997 in the name of *Teijin Limited*, was announced on 14 May 2003 (Bulletin 2003/20).

The patent, entitled "*Biaxially oriented laminate polyester film*" was granted with seventeen claims, Claim 1 reading as follows:

"1. A biaxially oriented laminate polyester film consisting of a polyester layer A containing lubricant particles I and II and a polyester layer B laminated on one side of the polyester A, wherein the lubricant particles I and II contain non-agglomerated particles in a proportion of 80 to 100%; the lubricant particles I have an average particle diameter of 0.3 to 1.0  $\mu\text{m}$  and are contained in an amount of 0.005% by weight or more but less than 0.1% by weight relative to the polyester layer A; the lubricant particles II have an average particle diameter which satisfies the following expression (1):

$$1 < d_I/d_{II} \leq 10$$

wherein  $d_I$  is an average particle diameter of the lubricant particles I and  $d_{II}$  is an average particle diameter of the lubricant particles II, and are contained in an amount of 0.1 % by weight or more but less than 1.0 % by weight."

Claims 2 to 14 were dependent on Claim 1. Claim 15 and dependent Claim 16 were directed to a magnetic recording medium comprising a base layer of the film of Claim 1 and Claim 17 was directed to the use of the film of Claim 1 as a base layer for a magnetic recording medium.

II. Notice of opposition was filed by

*Toray Industries, Inc.*

on 13 February 2004.

The opposition was based on the grounds of Articles 100(a), (b) and (c) EPC.

In support of its objections under the grounds of Article 100(a) EPC that the claimed subject-matter was not novel and lacked an inventive step the Opponent cited, *inter alia*, the following documents:

D1 JP-A 7 331 041;  
D1a English Translation of D1;  
D2 JP-A 7 258 523;  
D2a English Translation of D2;

and filed, with the submissions of 13 February 2004 and 20 October 2005, experimental reports 1 and 2 reworking example 4 of D1a (experimental report 1) and examples 2/comparative examples 1 to 4 of D1a (experimental report 2).

III. With its decision orally announced on 20 December 2005 and issued in writing on 25 January 2006 the Opposition

Division revoked the patent. The decision was based on the sets of claims filed with the letter dated 13 December 2005 as bases for a new main and auxiliary requests 1 to 3 and a set of claims according to auxiliary request 4 filed in the oral proceedings.

Claims 1 of these requests included the following amendments vis à vis Claim 1 as granted:

Main request:

the proportion of non-agglomerated particles was limited to 80 to 97%; expression (1) was replaced by expression (2)  $2 \leq d_I/d_{II} \leq 8$  according to granted Claim 5;

First auxiliary request:

further limitation of the non-agglomeration rate to 85 to 97%; expression (2) as in the main request;

Second auxiliary request:

non-agglomeration rate as in the first auxiliary request; limitation of expression (2) to  $3 \leq d_I/d_{II} \leq 7$ ;

Third auxiliary request:

agglomeration rate and expression (2) as in the main request, further including the alternative definitions of particles I and II according to Claims 8 or 9 as granted;

Fourth auxiliary request:

agglomeration rate and expression (2) as in the main request, further including the definition of particles I and II according to Claim 8 as granted.

The Opposition Division held that the amendments to the claims were admissible under Article 123(2) EPC, that the invention could be carried out by a skilled person pursuant to Article 83 EPC, and was novel over the cited prior art.

However, in the Opposition Division's opinion, the claimed subject-matter was not inventive over D1a. In arriving at this conclusion the Opposition Division started from the assumption that the Opponent's experimental reports 1 and 2 - in spite of their taking some measures undisclosed in D1a - represented a true reworking of the examples/comparative examples of D1a because, being the applicant of D1, the Opponent knew how the examples in D1a had been performed and could therefore supplement the missing information.

On that basis the Opposition Division found that the claimed polyester film differed from that of example 4 of D1a only in that the particle diameter ratio of the lubricant particles I and II was at least 2 instead of 1.67 according to D1a. Since no evidence was available to establish that this difference solved any technical problem not solved by D1a, the claimed subject-matter was considered obvious.

IV. Notice of appeal against the decision was filed by the Patent Proprietor (hereinafter: the Appellant) on 27 March 2006. The Statement of the Grounds of Appeal was submitted on 23 May 2006.

With the letter dated 6 March 2009 the Appellant submitted sets of claims according to a main request and auxiliary requests 1 to 3 which replaced all former requests.

Claim 1 of the new main request reads as follows:

"1. A biaxially oriented laminate polyester film consisting of a polyester layer A containing lubricant particles I and II and a polyester layer B laminated on one side of the polyester A, wherein the lubricant particles I and II contain non-agglomerated particles in a proportion of 80 to 97%; the lubricant particles I have an average particle diameter of 0.3 to 1.0  $\mu\text{m}$  and are contained in an amount of 0.005% by weight or more but less than 0.1% by weight relative to the polyester layer A; the lubricant particles II have an average particle diameter which satisfies the following expression (2):

$$2 < d_I/d_{II} \leq 8$$

wherein  $d_I$  is an average particle diameter of the lubricant particles I and  $d_{II}$  is an average particle diameter of the lubricant particles II, and are contained in an amount of 0.1 % by weight or more but less than 1.0 % by weight, wherein the lubricant particles II are inorganic particles."

This claim differs from Claim 1 as granted by the following amendments (in *italic*):

- the proportion for the non-agglomerated particles I and II was limited to 80 to 97%;
- expression (1) was replaced by expression (2):  
 $2 < d_I/d_{II} \leq 8$ ;
- lubricant particles II were limited to *inorganic particles*.

Claim 1 of the first auxiliary request includes the further limitation that the lubricant particles I are *cross-linked polymer particles* and the lubricant particles II are *silica particles*.

The lubricant particles I were further limited to *cross-linked polystyrene resin particles or cross-linked silicone resin particles* according to Claim 1 of the second auxiliary request.

Claim 1 of the third auxiliary request included the further limitation vis à vis the second auxiliary request that the lubricant particles I are *cross-linked polystyrene resin particles* only.

- V. The Opponent (hereinafter: the Respondent) considered the amendments to Claims 1 of the first to third auxiliary requests inadmissible under Article 123(2) EPC because the specific combinations of the lubricant particles I and II resulted from an arbitrary selection.

In order to further support its arguments against inventive step the Respondent, with its letter dated 31 July 2006, newly introduced the document

D7 EP-A 0 543 500.

Further documents were cited with the letter dated 16 March 2009 in order to establish that it was known that lubricant particles of films for magnetic recording tapes should be mono-disperse and not agglomerated.



With regard to the amended claims objections as to lack of novelty and insufficiency of disclosure were no longer raised.

VI. The arguments of the Appellant concerning the issue of inventive step can be summarized as follows:

The Respondent's reworking of some examples of D1a went beyond the disclosure of these examples, which did not specify a number of essential processing parameters such as:

- the extrusion and drawing conditions for the film;
- the conditions for adding the particles;
- the precise meaning of the general term "silicone"

All these features, however, influenced the agglomeration rate of the lubricant particles.

In view of the many possible permutations allowed by D1a, all leading to different results, the Respondent could obtain the results he got only by filling the disclosure gaps of D1a with his proprietary knowledge that was not in the public domain and not at the ordinary skilled person's disposal. These reworking experiments should therefore be disregarded.

In contrast, the claimed invention was based on a combination of three inseparable features, namely

- (a) the rate of non-agglomeration of the particles I and II of *80 to 97%*;
- (b) the  $d_I/d_{II}$  ratio of *more than 2 to 8*;
- (c) the *inorganic* nature of the smaller particles II.

Only with this combination of features were the superior properties with respect to scraping resistance of the polyester film and electromagnetic properties of the resulting magnetic recording tape reached, as emerged from example 4 and comparative example 4.

Moreover, D1a only taught very generally that the agglomeration rate of the lubricant particles should be kept low. In contrast, it was one of the key aspects of the invention to quantify the non-agglomeration rate and to find out that a low non-agglomeration of 80% was tolerable without compromising the desired high abrasion resistance. This could not be expected in view of the information in paragraph [0041] Table 1 of D2a according to which even very high non-agglomeration rates of 90% and 94% (comparative examples 1 and 2) could not guarantee a satisfactory abrasion resistance of the polyester film.

Furthermore, when considering the chronology of the publication dates of D7 (May 1993) - D2 (October 1995) - D1 (December 1995) a trend could be observed leading away from the use of inorganic particles II according to D7 in favour of the use of organic particles according to D2 and D1. This was corroborated by the disclosure in the paragraph bridging pages 5/6 of D1a that inorganic particles due to their hardness may lead to significant damage of the film surface.

The claimed polyester film was thus not obvious either from D1a alone or in combination with D7.

VII. The Respondent provided the following counterarguments:

Sufficient guidance was given in D1a, paragraph [0055], which enabled a skilled person using his common general knowledge, to rework the examples of D1a. If it were otherwise, the examples of the patent would also not be reproducible because a similar lack of disclosure of processing parameters occurred in the patent specification.

There was also a clear disclosure in paragraph [0021] of D1a that coagulation of the particles should be avoided in order not to impair the abrasion resistance of the film. It was therefore obvious from D1a to keep the agglomeration rate of the particles I and II as low as possible.

The Appellant's further argument that the ratio  $d_I/d_{II}$  was an essential feature for the performance of the invention was not convincing. Comparative example 1 of the patent specification using a  $d_I/d_{II}$  ratio of 12, outside the claimed range, showed in comparison with comparative examples 2 to 4 using a  $d_I/d_{II}$  ratio inside the claimed range that the  $d_I/d_{II}$  ratio provided no technical contribution to the performance of the invention. The definition of the particle size range " $2 < d_I/d_{II} \leq 8$ " could therefore not support an inventive step.

As to the Appellant's argument that the prior art led away from the use of inorganic particles this was contested because a sequence of only three documents was insufficient to establish a trend.

Hence, it was obvious from a combination of D1a with D7 to maintain a very high non-agglomeration rate, to replace the smaller organic particles II according to D1a by inorganic particles according to D7 and to enhance the  $d_I/d_{II}$  ratio to a value  $> 2$ .

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or one of the auxiliary requests 1 to 3, all filed with the letter dated 6 March 2009.

IX. The Respondent requested that the appeal be dismissed.

### **Reasons for the Decision**

1. The appeal is admissible.
2. Opposition Grounds according to Articles 100(b) and (c) EPC

Having regard to the outcome of these appeal proceedings, which is that all requests are not allowable because of lack of inventive step (as will be shown below), a decision on the objections under Articles 100(b) and (c) EPC is redundant.

3. *Novelty*

In view of the limitation of the lubricant particles II to inorganic particles, the Respondent did not maintain the objections as to lack of novelty.

The Board shares the opinion of the parties that the subject-matter of all requests is novel over the cited prior art.

4. Inventive step

4.1 The subject-matter of the patent in suit

The patent is concerned with a biaxially oriented laminate polyester film which is especially suitable as base film for magnetic recording tapes and possesses good flatness, scraping resistance and take-up property (paragraph [0001]).

According to the claims of the requests the film is characterized by the following essential elements:

- (a) the film consists of two layers A and B, the layer A containing lubricant particles I and II which are contained in the layer A in defined amounts (0.005 to less than 0.1 % by weight relative to layer A for the particles I and 0.1 to less than 1.0 % by weight relative to layer A for particles II);
- (b) the average particle diameter of the particles I is from 0.3 to 1.0  $\mu\text{m}$  and the ratio of the average particle diameter  $d_I/d_{II}$  is from more than 2 to 8, i.e. the average particle diameter of the particles II, in one specific film, is smaller than that of particles I;
- (c) the particles I and II contain non-agglomerated particles in a proportion of 80 to 97 %;

- (d) according to the different requests the nature of the particles I and II is as follows:
- main request: nature of particles I not defined (i.e. they can either be organic or inorganic); particles II must be inorganic;
  - auxiliary request 1: particles I are cross-linked polymer particles; particles II are silica particles;
  - auxiliary request 2: particles I are cross-linked polystyrene particles or cross-linked silicon resin particles; particles II are silica particles;
  - auxiliary request 3: particles I are cross-linked polystyrene particles only; particles II are silica particles.

#### 4.2 The closest prior art

D1a can be considered representative of the closest prior art. This document discloses a biaxially oriented laminate polyester film with good surface flatness, slipperiness, abrasion resistance and winding up property, which is suitable for magnetic recording media (pages 1/2 [Effects] in conjunction with paragraph [0042]). The film is characterized by the following features:

- (a) the film is either a single-layer or a laminated film (paragraph [0037]) and the single layer, irrespective of its lamination with another layer, contains lubricant particles A in an amount of 0.01 to 2.0 % by weight and lubricant particles B

in an amount of 0.005 to 2.0 % by weight  
([Claim 1]);

- (b) the average particle diameter of the particles A is 0.01 to less than 0.6  $\mu\text{m}$ , in particular 0.1 to less than 0.5  $\mu\text{m}$ , and that of the particles B is 0.1 to less than 0.6  $\mu\text{m}$ , in particular 0.3 to less than 0.6  $\mu\text{m}$ ; the average particle diameter of particles B is larger than that of the particles A and their content is less than or equal to that of the particles A ([Claim 1], paragraph [0028]); in other words, particles B according to D1a correspond to particles I as claimed and particles A correspond to particles II as claimed;
- (c) the proportion of non-agglomeration of the particles A and B is not defined; however, it is derivable from paragraph [0021] that coagulation (ie agglomeration) of the particles should not occur because it impairs surface evenness and abrasion resistance of the film; according to paragraph [0022] excellent dispersiveness of the particles is desired;
- (d) both particles A and B are of organic nature and include in particular cross-linked macromolecular particles (paragraphs [0013/0014]).

From the above disclosure in D1a the following conclusions can be drawn:

- (a) the ranges for the amount of particles A (corresponding to particles II of the patent) and of particles B (corresponding to particles I) considerably overlap with the claimed ranges and relate to one single layer;

- (b) the particularly preferred average particle diameter ratio  $d_B/d_A$  can be calculated to be 0.6 to 6 with the proviso that  $d_B$  is larger than or equal to  $d_A$  (see point (b) above); this means that the practicable range is from 1 to 6, which broadly overlaps with the claimed range of from  $> 2$  to 8 for  $d_I/d_{II}$ ;
- (c) the rate of non-agglomeration of the particles A and B should be high;
- (d) only polymeric organic particles are used as particles A and B.

The biaxially oriented two-layer polyester (PET) film described in example 4 of D1a is an embodiment which illustrates one specific realisation of the above teaching of D1a. According to Table 1 at page 30 the film consists of a first polyester layer with a thickness of 2  $\mu\text{m}$  and a second polyester layer with a thickness of 5  $\mu\text{m}$  and contains in the first polyester layer organic lubricant particles A and B. The amounts of 0.3 wt.-% for particles A (= particles II) of 0.05 wt.-% for particles B (= particles I) are within the claimed ranges (that the particle content relates to the first polyester layer only is apparent from the paragraph bridging pages 28 and 29 which associates the particle content to the 1  $\mu\text{m}$  "lamine portions"; this was no longer contested by the Appellant in the oral proceedings). The average particle diameter ratio  $d_B/d_A$  corresponding to  $d_I/d_{II}$  is  $0.5\mu\text{m}/0.3\mu\text{m} = 1.67$ .

The aforementioned features and conclusions can be derived from D1a without taking into account the experimental reports 1 and 2 submitted by the Respondent which, in the Board's view, do not represent



a correct reworking of the examples in D1a for the reasons put forward by the Appellant (point VI).

4.3 The problem to be solved

The Appellant submitted that the claimed film differed from this specific embodiment in the following three features:

- (b) the minimum  $d_I/d_{II}$  ratio is more than 2;
- (c) the non-agglomeration rate - which is not quantified in D1a - should be 80-97%;
- (d) the particles II are of inorganic nature.

The Board does not share the Appellant's analysis of D1a:

*As to (b):*

As shown above, it is within the general teaching of D1a to vary the  $d_I/d_{II}$  ratio between 1 and 6, i.e. considerably within the claimed range of  $> 2$  to 8. A skilled person would therefore consider a two-layer polyester film with a  $d_I/d_{II}$  ratio within the claimed range to be an obvious alternative to the film of example 4.

*As to (c):*

In view of the before mentioned teaching in D1a the skilled person would also try to avoid agglomeration of the particles as much as possible, ie ideally completely.

In the absence of a concrete disclosure one can only conclude that it is more probable than not that this is indeed the case for the films of example 4. This is further supported by the following considerations.

The Appellant argued with regard to the dispersibility (ie agglomeration) values depicted in Table 1 of D2a, showing for comparative examples 1 and 2 an insufficient abrasion resistance at a non-agglomeration rate of 90 or 94%, that the claimed range of non-agglomeration of 80 to 97%, was one of the distinguishing aspects of the invention (point VI). This argument, however, is not convincing, since the films of D2a cannot be compared with the claimed films because they contain only one kind of lubricant particles and not two different kinds as required by the claimed invention and also by D1a. Moreover, D2a on several occasions highlights the requirement of an excellent particle dispersibility (ie non-agglomeration: cf. paragraph [0001]; last sentences of paragraphs [0004] and [0007]; first sentence of paragraph [0012]; paragraph [0041]) and it cannot reasonably be argued that D2a, taken as a whole, militates against low agglomeration.

Furthermore, there is no evidence that according to the claimed invention a non-agglomeration rate of 80% represents a critical threshold.

Therefore, the definition of this lower limit is considered to be purely arbitrary and not related to any inventive effort.

As to the upper limit of the claimed agglomeration range of 97% this seems to be the highest value obtainable in terms of practicability, as set out by

the Appellant itself in paragraph [0027] of the patent specification.

Taking the above into account and considering furthermore that the very high non-agglomeration rates of D2a are obtained in the same way as in D1a (cf paragraph [0021]) with cross-linked organic polymer particles having a thermal decomposition temperature of at least 350°C (this property said to be important to prevent coagulation), the warning in D1a against coagulation/agglomeration of the particles can only be interpreted to relate to the preference of similarly high agglomeration rates at least overlapping the claimed non-agglomeration range.

*As to (d):*

It follows, that in the Board's judgment the claimed films differ, from those disclosed of D1a effectively only by the use of inorganic particles II instead of organic particles. The other ostensible differences ( $d_I/d_{II}$  ratio between 2 and 8; non-agglomeration rate 80-97%) are to be considered as being within the disclosure of D1a.

There is however no evidence that the change from organic to inorganic particles is causative of any unforeseeable effect.

In view of this analysis, the problem to be solved by the claimed invention can only be seen in the provision of an alternative polyester film suitable for magnetic recording media.

#### 4.4 Obviousness

With reference to JP-A 61-177227 it is stated in paragraph [0007] of D1a that the simultaneous use of (inorganic) silica or titanium particles with calcium carbonate particles causes problems, *inter alia* in that small amounts of shavings damage the film surface. In the Appellant's view this disclosure, together with the chronology: D7 -D2 - D1 (point VI) establishes a trend leading away from inorganic particles in favour of organic particles.

The Board does not share this view.

First of all it is unrealistic that a general trend dictating a technical development in a certain direction (here: away from inorganic particles) can be established, in an area covered by a vast host of publications, by only three documents, which, moreover, have been published within the short time period of only two and a half years.

Furthermore, as the Appellant states itself in paragraph [0010] of the patent specification, it is known in the prior art that damage of the film surface is only caused by (inorganic) silica particles which are too large in size and therefore protrude and provide a high surface roughness.

The skilled person is therefore not principally prevented from the use of inorganic particles, as long as the necessary precautions are taken to prevent the above described damaging effect, eg by avoiding too large inorganic particles.

#### 4.4.1 Main Request

According to Claim 1 the smaller lubricant particles II are inorganic.

It is, however, disclosed in D7 that in a biaxially oriented polyester film for magnetic recording media containing in one layer two kinds of lubricant particles, the smaller particles - which maintain the film surface at a desired roughness providing good abrasion resistance, running ability and high quality image - need not be organic, but can be inorganic, preferably non-agglomerated silica particles, eg spherical particles originating from colloidal silica (page 3, lines 12 to 14 in conjunction with page 3, lines 40 to 43).

The skilled person could therefore expect that a high quality film surface can be maintained by replacement of the smaller polymer particles A according to D1a by the small inorganic particles according to D7.

This modification of the disclosure of D1a is thus obvious over a combination of D1a with D7 and the claimed film therefore lacks an inventive step.

Hence, the main request is not allowable.

#### 4.4.2 Auxiliary Request 1

According to Claim 1 the particles I are cross-linked polymer particles and the particles II are silica particles.

In view of the disclosure in paragraph [0014] of D1a that the organic particles are preferably cross-linked (page 9, line 7-9), and with regard to the preferred

use of spherical silica as smaller inorganic particles according to D7 (see above), the subject-matter of Claim 1 is also obvious over a combination of D1a with D7.

The auxiliary request is therefore not allowable either.

#### 4.4.3 Auxiliary Requests 2 and 3

Claim 1 of auxiliary request 2 differs from Claim 1 of auxiliary request 1 in that the particles I are limited to the alternative: "cross-linked polystyrene particles or cross-linked silicone resin particles".

Vinyl-based cross-linked particles including those based on polystyrene are, however, particularly preferred resin particles in D1a (paragraphs [0013] to [0019]). Thus, a combination of D1a with D7 also renders the subject-matter of Claim 1 of auxiliary request 2 obvious.

The same consideration also applies to Claim 1 of auxiliary request 3 according to which the particles I can only be cross-linked polystyrene particles.

Therefore, auxiliary requests 2 and 3 share the fate of the previous requests.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar

The Chairman

G. Röhn

P. Kitzmantel