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**Datasheet for the decision
of 22 February 2007**

Case Number: T 1146/04 - 3.3.09

Application Number: 96302068.0

Publication Number: 0734854

IPC: B32B 27/32

Language of the proceedings: EN

Title of invention:
Polyolefin-based laminate film

Patentee:
TORAY INDUSTRIES, INC.

Opponent:
Treofan Germany GmbH & Co. KG

Headword:

-

Relevant legal provisions:
EPC Art. 54, 56, 84, 123(3)

Keyword:
"Main request, auxiliary request 1: novelty established by product-by-process feature (no)"
"Auxiliary request 2: novelty, inventive step (yes)"

Decisions cited:
T 0411/89, T 0166/92, T 1002/92

Catchword:

-



Case Number: T 1146/04 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 22 February 2007

Appellant: Treofan Germany GmbH & Co. KG
(Opponent) Bergstrasse
D-66539 Neunkirchen (DE)

Representative: Kremer, Viola
Treofan Germany GmbH & Co. KG
Am Prime Parc 17
D-65479 Raunheim (DE)

Respondent: TORAY INDUSTRIES, INC.
(Patent Proprietor) 2-1, Nihonbashi Muromachi 2-chome
Chuo-ku
Tokyo 103-8666 (JP)

Representative: Coleiro, Raymond
MEWBURN ELLIS LLP
York House
23 Kingsway
London WC2B 6HP (GB)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office orally announced
13 March 2002 and posted 29 July 2004 rejecting
the opposition filed against European patent
No. 0734854 pursuant to Article 102(2) 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. 0 734 854 in respect of European patent application No. 96 302 068.0, filed on 26 March 1996 in the name of *Toray Industries, Inc.*, was announced on 21 June 2000.

The patent, entitled "*Polyolefin-based laminate film*" was granted with twenty one claims, Claims 1 and 20 reading as follows:

"1. A polyolefin-based laminate film comprising at least four layers, which said film comprises:

at least a first polyolefin-based resin layer;

a polyolefin-based mixed resin layer formed on one surface of said first polyolefin-based resin layer, said polyolefin-based mixed resin layer having a surface thereof treated by a discharge treatment and said polyolefin-based mixed resin layer containing, in an amount of 5-30% by weight of the polyolefin-based mixed resin layer, an additive material which is at least one component selected from petroleum resins and terpene resins,

a vapor-deposited metal layer formed on the discharge-treated surface of said polyolefin-based mixed resin layer; and

a heat seal layer formed on the surface of said first polyolefin-based resin layer opposite said surface on which said polyolefin-based mixed resin layer is formed."

"20. A wrapping film comprising:

at least a first polyolefin-based resin layer,

a polyolefin-based mixed resin layer formed on one surface of said first polyolefin-based resin layer, said polyolefin-based mixed resin layer having a surface thereof treated by a discharge treatment and said polyolefin-based mixed resin layer containing, in an amount of 5-30% by weight of the polyolefin-based mixed resin layer, an additive material which is at least one component selected from petroleum resins and terpene resins;

a vapor-deposited metal layer formed on the discharge-treated surface of said polyolefin-based mixed resin layer;

a heat seal layer formed on the surface of said first polyolefin-based resin layer opposite said surface on which said polyolefin-based mixed resin layer is formed;

a polyethylene layer formed on said vapor-deposited metal layer; and

a biaxially oriented polyolefin-based resin layer formed on said polyethylene layer."

Claims 2 to 19 were, either directly or indirectly, dependent on Claim 1. Claim 21 was dependent on Claim 20.

II. Notice of opposition based on Article 100(a) EPC was filed by *Trespaphan GmbH* (now *Treofan Germany GmbH*) on 21 March 2001. The Opponent requested revocation of the patent in its entirety because the claimed subject-matter lacked novelty and inventive step. *Inter alia*, the following document was cited:

D1 EP-A 0 488 010

III. With its decision, orally announced on 13 March 2002 and issued in writing on 29 July 2004, the Opposition Division rejected the opposition.

It was held in the decision that the subject-matter of the patent as granted was novel and inventive over the subject-matter disclosed in D1.

With regard to novelty the Opposition Division reasoned that for the metallised biaxially oriented transparent multilayer polypropylene film disclosed in D1, the amount of the low molecular weight resin in the polyolefin-based mixed resin layer was not specified, which could therefore be below or above 5-30% by weight as claimed in the patent.

D1 was also considered representative of the closest prior art for the assessment of inventive step. The problem to be solved by the invention was defined by the Opposition Division as the provision of metallised polyolefin-based laminate films with a non-peelable metal layer, vapor-deposited onto the surface of the polyolefin-based resin layer, the film providing good moisture proof and gas barrier properties.

It was argued that D1 was not concerned with the improvement of gas barrier properties of the metallised multilayer film disclosed therein and did not provide any experimental data as to the adhesion strength of the metal layer. A skilled person starting from D1 and intending to improve these film properties would not therefore be motivated to incorporate a low molecular weight resin in an amount of from 5 to 30% by weight into the polymer layer next to the metal layer.

- IV. On 15 September 2004 the Opponent (hereinafter: the Appellant) lodged an appeal against the decision of the Opposition Division. The Statement of the Grounds of Appeal was submitted on 8 December 2004.

The Appellant maintained its objections as to lack of novelty and lack of an inventive step vis à vis D1 which had been raised in the opposition proceedings, and cited for the first time the document:

D7 EP-A 0 282 917.

- V. In reaction to the late filing of the document D7 the Patent Proprietor (hereinafter: the Respondent) requested in the letter dated 22 June 2005, that D7 either be not admitted into the appeal proceedings or the case be remitted to the Opposition Division in the event that D7 was admitted by the Board.

With the same letter, four sets of claims as bases for a new main request and auxiliary requests 1 to 3 were submitted.

Claim 1 according to the new main request differs from the corresponding Claim 1 as granted by the incorporation of the features of granted Claim 10. The passage "said polyolefin-based mixed resin layer having a surface thereof treated by a discharge treatment ..." was amended to : "said polyolefin-based mixed resin layer having a surface thereof provided by characteristics obtainable by a discharge treatment in an atmosphere of CO₂ and/or N₂ ..." (amendments emphasised by the Board). The passage was introduced into Claim 20 as granted as well, which Claim was renumbered to read Claim 19, caused by the deletion of granted Claim 10.

In a similar manner, Claims 1 and 19 of auxiliary request 1 were amended by the insertion of the wording "in an atmosphere of CO₂ and/or N₂" after "... treated by a discharge treatment".

According to auxiliary request 2 the category of the claims was changed. All claims were redrafted as process claims. Claims 1 and 19 read as follows:

"1. A process for producing a polyolefin-based laminate film comprising at least four layers, which said film comprises:

at least a first polyolefin-based resin layer,

a polyolefin-based mixed resin layer formed on one surface of said first polyolefin-based resin layer, said polyolefin-based mixed resin layer having a surface thereof treated by a discharge treatment and said polyolefin-based mixed resin layer

containing, in an amount of 5-30% by weight of the polyolefin-based mixed resin layer, an additive material which is at least one component selected from petroleum resins and terpene resins,

a vapor-deposited metal layer formed on the discharge-treated surface of said polyolefin-based mixed resin layer and

a heat seal layer formed on the surface of said first polyolefin-based resin layer opposite said surface on which said polyolefin-based mixed resin layer is formed,

in which process,

the said polyolefin-based mixed resin layer is formed on one surface of the polyolefin-based resin layer;

a heat seal layer is formed on the other surface of the polyolefin-based resin layer;

a surface of the polyolefin-based mixed resin layer is treated with a discharge treatment in an atmosphere of CO₂ and/or N₂; and

a metal layer is formed by vapor deposition on the discharge-treated surface of said polyolefin-based mixed resin layer."

"19. A process for producing a wrapping film comprising:

at least a first polyolefin-based resin layer,

a polyolefin-based mixed resin layer formed on one surface of said first polyolefin-based resin layer, said polyolefin-based mixed resin layer having a surface thereof treated by a discharge treatment and said polyolefin-based mixed resin layer containing, in an amount of 5-30% by weight of the polyolefin-based mixed resin layer, an additive material which is at least one component selected from petroleum resins and terpene resins,

a vapor-deposited metal layer formed on the discharge-treated surface of said polyolefin-based mixed resin layer;

a heat seal layer formed on the surface of said first polyolefin-based resin layer opposite said surface on which said polyolefin-based mixed resin layer is formed;

a polyethylene layer formed on said vapor-deposited metal layer; and

a biaxially oriented polyolefin-based resin layer formed on said polyethylene layer;

in which process,

the said polyolefin-based mixed resin layer is formed on one surface of the polyolefin-based resin layer;

a heat seal layer is formed on the other surface of the polyolefin-based resin layer;

a surface of the polyolefin-based mixed resin layer is treated with a discharge treatment in an atmosphere of CO₂ and/or nitrogen;

a metal layer is formed by vapor deposition on the discharge-treated surface of said polyolefin-based mixed resin layer;

a polyethylene layer is formed on said vapor-deposited metal layer; and

a biaxially oriented polyolefin-based resin layer is formed on said polyethylene layer."

Claims 2 to 18 are dependent on Claim 1 and Claim 20 is dependent on Claim 19.

The claims according to auxiliary request 3 are not discussed in what follows because the patent was maintained on the basis of auxiliary request 2.

VI. In the oral proceedings before the Board, which took place on 22 February 2007, the following issues in particular were discussed:

(a) Admittance of the late filed document D7 into the proceedings;

(b) Clarity - Article 84 EPC;

- (c) Extension of the scope of protection by the claims of the main request - Article 123(3) EPC;
- (d) Novelty of the subject-matter according to the main request and the auxiliary requests 1 and 2 over D7;
- (e) Inventive step of the process according to auxiliary request 2 taking D7 as the closest prior art.

VII. The arguments provided by the Appellant were as follows:

- (a) D7 should be admitted into the proceedings because of its relevance, which emerged only after reconsideration of the patent by technical experts and which was *prima facie* not recognizable as relevant from the title or the abstract on the cover sheet. Furthermore, the document was not cited in the European search report.
- (b) The feature in the independent claims of all requests concerning the discharge treatment in CO₂ and/or N₂ was unclear because the volume portions of these gases, based on the total gas volume, were not defined. A small amount of carbon dioxide and a considerable amount of nitrogen are also contained in air. It was therefore not clear whether or not the above feature excluded a discharge treatment in air, including the presence of oxygen.

- (c) The wording "obtainable by a discharge treatment in an atmosphere of CO₂ and/or N₂" in Claims 1 and 19 of the new main request not only included films which were surface treated in a carbon dioxide/nitrogen atmosphere but also any other films obtainable by different surface treatment methods as far as their properties were identical. The word "obtainable", therefore, constituted an extension of the scope of the granted patent, contrary to Article 123(3) EPC.
- (d) The document D7 described a metallised polyolefin-based laminate film and its preparation, the film having the same layer-structure as that claimed in Claims 1 of all requests. The amount of the petroleum and terpene resins contained in the polyolefin-based mixed resin layer was preferably 6 to 10% by weight and therefore within the claimed range of 5 to 30% by weight. Although D7 was silent on the atmosphere in which the discharge treatment was performed, it had to be assumed that the surface of the polyolefin-based mixed resin layer was treated in air. Air was, however, not excluded by the unclear definition in the claims "in an atmosphere of CO₂ and/or N₂".

Moreover, the feature concerning the discharge treatment in carbon dioxide and/or nitrogen was a product-by-process feature which was not detectable on the film itself. Therefore, a film treated in a carbon dioxide/nitrogen atmosphere according to the invention as claimed according to the main request and the auxiliary request 1 was

not distinguishable from a film treated in air according to D7.

The film according to the claims of the main request and auxiliary request 1 was therefore not novel over D7.

Since the indication "in an atmosphere of CO₂ and/or N₂", without defining the volume percentage of both gases, did not clearly distinguish the discharge treatment from a treatment in air, the same also applied to the process according to Claim 1 of auxiliary request 2.

- (e) The treatment of polymer surfaces by corona discharge in the presence of various gases, and apparatuses for performing such a treatment, were known to a skilled person. No inventive step could be seen in filling such an apparatus with carbon dioxide and/or nitrogen, in particular because the Respondent had not demonstrated a surprising effect caused by the selection of CO₂ and/or N₂.

According to the examples 1, 3 and 4 in the patent specification, the range of the peel strength of a vapor deposited aluminium layer, due to a CO₂/N₂ discharge treatment, was from 390 to 570 g/inch whereas a treatment in air according to example 2 led to a peel strength of 370 g/inch, which was only slightly below this range. The same applied to the range for the oxygen transmission barrier which was from 0.68 to about 1.03 after a treatment in CO₂/N₂ (examples 1, 3, 4) and 0.8 after a treatment in air (example 2).

The process claimed according to the auxiliary request 2, as far as it excluded air as a treatment gas, was therefore not inventive.

VIII. The Respondent argued as follows:

- (a) The outcome of the first instance opposition proceedings, ie the rejection of the opposition, did not warrant carrying out further searches for documents with a view to their being produced at the appeal stage.
- D7 was therefore late-filed and should not be admitted.

However, if the Board considered D7 to be of such relevance as to threaten the maintenance of the patent, the case should be remitted to the Opposition Division, in accordance with the decision T 166/91 (not published in the OJ EPO), in order to reserve the Respondent's right to defend the patent at two levels.

- (b) The feature that one surface of the polyolefin mixed resin layer was treated in an atmosphere of CO₂ and/or N₂ was clear. The claims had to be read in the context of the whole disclosure of the patent specification, which clearly set out at page 4, line 10, that it was preferred to perform the discharge treatment under a CO₂ and/or N₂ atmosphere rather than in air. A skilled person therefore knew that the said feature excluded air, and in particular oxygen.

- (c) In the decision T 411/89 (not published in the OJ EPO) it was stated (reasons, 2.2.) that the word "obtainable" instead of "obtained" did not change the scope of the patent. Introduction of the wording "*obtainable by a discharge treatment in an atmosphere of CO₂ and/or N₂*" into Claims 1 and 19 of the main request did therefore not violate Article 123(3) EPC.
- (d) D7 did not anticipate the subject-matter according to the main request or auxiliary requests 1 or 2. The different process feature according to the invention that the film was treated in an atmosphere of CO₂ and/or N₂ resulted in films which were, by means of measurable parameters, distinguishable from those obtained by a corona treatment in air in accordance with D7. A direct comparison of example 1 with example 2 (table 1) and of example 11 with example 12 (table 4), showed that the treatment in CO₂/N₂ according to the invention resulted in a higher peel strength of the deposited metal layer and a lower oxygen transmission (examples 1, 11) than the corresponding treatment in air (examples 2, 12).
- (e) There was no indication in D7 that both the peel strength of the metal layer and the rate of oxygen transmission through the film could be varied by selecting the appropriate gas atmosphere during the corona treatment of the metallisable polyolefin surface layer. A skilled person, starting from D7 and intending to prepare metallised multilayer films with an improved peel strength and a reduced oxygen transmission was

therefore not motivated to select a CO₂/N₂ atmosphere in order to solve the problem posed. The process according to auxiliary request 2 was therefore inventive.

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

- X. The Respondent requested that the patent be maintained on the basis of the new main request or, alternatively, on the basis of one of the auxiliary requests 1 to 3, all submitted with the letter dated 22 June 2005.

At the end of the oral proceedings the Respondent withdrew its previous request for remittal of the case to the Opposition Division (cf. point VIII (a) above) subject to the proviso that the Board allowed auxiliary request 2.

Reasons for the Decision

- 1. The appeal is admissible

- 2. Admittance of the document D7 into the proceedings

In application of the principles laid down in T 1002/92 (OJ EPO 1995, 605) D7 is introduced into the proceedings because of its considerable relevance.

3. Clarity - Article 84 EPC - and extension of the scope -
Article 123(3) EPC

The Board considers that, contrary to the argument of the Appellant (see point VII.(b), the person skilled in the art would normally not equate the word "air" with the expression "an atmosphere of CO₂ and/or N₂". Moreover, in the context of a discharge treatment to which this term refers, and in the absence of any exceptional circumstances, this being the case here, the expression "in an atmosphere of CO₂ and/or N₂" not only does not involve the presence of air, but is in particular to be understood as excluding the presence of its oxygen portion; this emerges in particular from page 4, lines 9 to 14 of the description of the patent specification.

According to the jurisprudence of the boards of appeal (see T 411/89 and Case Law of the Boards of Appeal, 5th edition 2006 page 213, point 6.5) the word "obtainable" in a product-by-process claim does not extend the protection conferred by the patent as granted. The Board therefore does not accept the Appellant's view (see point VII.(c)) that the claims according to the main request violate Article 123(3) EPC.

Main Request and Auxiliary Request 1

4. Novelty over D7

Document D7 discloses a sealable polyolefin-based metallised laminate film and its preparation comprising four layers with the following layer sequence:

- a polypropylene base layer;
- a metallisable polypropylene-based cover layer formed on one surface of the above polypropylene base layer and having a surface thereof which has been treated by a corona discharge treatment, the layer further containing a hydrocarbon resin (inter alia a petroleum or terpene resin) in a preferred amount of 6 to 10% by weight;
- a vapor-deposited metal layer formed on the discharge-treated surface of the cover layer;
- a heat seal layer formed on the surface of the polypropylene base layer opposite the surface on which the cover layer is formed;

cf. Claims 1 to 6 and 12 and 13 in conjunction with page 2, line 39, to page 4, line 27. The metal layer of the film shows an improved adhesion onto the discharge-treated surface of the cover layer and the film has low water vapor and oxygen transmission properties (page 4, lines 27 to 34).

In contrast to the claimed film, D7 does not indicate that the discharge-treated layer surface next to the metal layer was treated in an atmosphere of CO₂ and/or N₂. Because of the lack of any further information in D7 as to the treating atmosphere, it has to be assumed that the discharge treatment was performed in air.

For assessing novelty, it is therefore to decide whether or not the treatment in a CO₂/N₂ atmosphere according to the invention makes the films themselves, as claimed by the main and the first auxiliary request, distinguishable from the film according to D7.

In this context, the Respondent argues (point VIII (d)) that the CO₂/N₂ discharge treatment represented a novelty-establishing difference, because it resulted in an improved peel strength of the metal layer and reduced oxygen transmission. This emerged, in the Respondent's view, from a comparison of examples 1 with 2 as well as of examples 11 with 12, which were directly comparable because in each pair of examples an identical layer composition was used and the only difference was the treatment in CO₂/N₂ (examples 1 and 11 according to the invention) and the treatment in air (examples 2 and 12, representing the prior art according to D7).

In the Board's judgment this argument is, however, not convincing.

In providing sufficient evidence that a product-by-process feature makes a product according to the invention distinguishable from a product of the prior art by way of a measurable parameter, it has to be unambiguously shown that such a difference exists for the product throughout its whole claimed extent.

The Respondent, however, has not proved this for the claimed film.

In this respect it has to be kept in mind that the manner in which the discharge treatment is to be performed according to the claimed invention is not defined with regard to the actual constitution of the "atmosphere of CO₂ and/or N₂" (gas mixtures are included), and/or the time and intensity of the treatment. Furthermore the film layer upon which the vapour layer is deposited after the discharge treatment

is very broadly defined as a polyolefin-based mixed resin layer comprising 5-30% by weight of petroleum resins and terpene resins and furthermore including conventional additives; its response to the discharge treatment will therefore vary, leading to different metal adhesion.

Consequently, it is not possible to trace back any possible differences in peel strength of the metal layer solely to the constitution of the discharge treatment atmosphere. It follows that the peel strength is not a property allowing a distinction to be reliably made between films covered by the claimed invention whose discharge treatment was performed in an "atmosphere of CO₂ and/or N₂" and others differing only by a treatment in air.

Therefore, the mere indication in the product-by-process feature of Claim 1 that the layer surface was discharge-treated "in an atmosphere of CO₂ and/or N₂", together with the reference to an improved peel strength of the metal layer for the two films of examples 1 and 11 of the patent specification, is not apt to establish a reliable distinction between the claimed films and those described in D7. A reliable distinction of this kind is, however, a precondition for the recognition of novelty.

The above reasoning can, *mutatis mutandis*, also be applied to the oxygen transmission.

The Board, therefore, concludes that the subject-matter according to Claims 1 of the main request and auxiliary request 1 is not novel over D7.

Both requests are therefore not allowable.

Auxiliary Request 2

5. Novelty

The process according to auxiliary request 2 is novel over D7 because a discharge treatment in an atmosphere of CO₂ and/or N₂ is not disclosed in this document.

The same applies to the novelty over the other documents cited.

6. Inventive step

6.1 The patent in suit

The patent in suit is concerned with sealable multilayer metallised polyolefin-based films for wrapping applications having improved moisture-proof and gas barrier properties (paragraph [0001] of the patent specification).

Accordingly, a four layer film is prepared by

- providing a first polyolefin-based resin layer
- forming a polyolefin-based mixed resin layer, containing 5 to 30% by weight of a petroleum or terpene resin, on one surface of the first polyolefin-based resin layer;
- forming a heat seal layer on the other surface of the first polyolefin-based resin layer;
- discharge treating a surface of the polyolefin-based mixed resin layer in an atmosphere of CO₂ and/or N₂; and

- forming a metal layer by vapor deposition onto the discharge treated surface of the polyolefin-based mixed resin layer;

cf. Claim 1 of auxiliary request 2.

6.2 The closest prior art

Document D7 is representative of the closest prior art. As mentioned above under point 4, D7 also relates to metallised sealable four layer films having low oxygen and water vapor transmission and their preparation by forming the same layer structure as in the contested patent, the only difference being that the discharge treatment of the surface of the metallisable polyolefin-based layer containing the petroleum/terpene resin is supposed to have been performed in air instead of CO₂/N₂.

6.3 The problem to be solved

The experimental evidence in the patent specification, in particular the comparison of example 1 with example 2 (Table 1) and example 11 with example 12 (Table 4) demonstrates that - at given equal compositions and thicknesses of the three polymeric layers A (polyolefin-based mixed resin layer), B (polyolefin-based resin layer) and C (heat seal layer) - it is possible to arrive at a higher peel strength of the metallic layer (aluminium) deposited onto layer A and a lower oxygen transmission through the film, if the discharge treatment of the metallisable surface of the layer A is performed in CO₂/N₂ instead of air.

Therefore, the problem to be solved is seen in providing a process for preparing a heat-sealable metallised multilayer film having improved properties as regards adhesion of the metallic layer and reduction of the oxygen transmission.

6.4 Obviousness

The solution to the problem, namely to carry out the discharge-treatment of the surface of the polyolefin-based mixed resin layer in a CO₂ and/or N₂ atmosphere before the metallic layer is vapor deposited onto this surface, is not rendered obvious by the prior art. None of the other citations suggests that carrying out the discharge treatment in a CO₂/N₂ gas atmosphere instead of air would have a positive influence on the adhesion of the metallic layer and the gas transmission properties of the whole film.

6.5 Conclusion

The process according to Claim 1 of the auxiliary request 2 is therefore inventive over the prior art.

The same applies to the process for preparing the wrapping film according to Claim 19 which includes the process of Claim 1 with the only variation that two further layers in sequence - a polyethylene layer and a biaxially oriented polyolefin-based resin layer - are formed on the metal layer.

Dependent Claims 2 to 18 are allowable with Claim 1 and dependent Claim 20 is allowable with Claim 19 subject to the proviso that the category of Claims 16 to 18

and 20 is adapted to the process according to Claims 1 and 19, respectively.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the European patent on the basis of the following documents:
 - Claims 1 to 15 and 19 according to the subsidiary request 2 filed with the letter dated 22 June 2005;
 - Claims 16 to 18 and 20 according to subsidiary request 2 filed with the letter dated 22 June 2005, after adaptation of their category to Claims 1 and 19, respectively;
 - description after any necessary consequential amendment.

The Registrar

The Chairman

D. Sauter

P. Kitzmantel