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**D E C I S I O N**  
**of 20 June 2006**

**Case Number:** T 0274/04 - 3.3.09

**Application Number:** 96305967.0

**Publication Number:** 0758675

**IPC:** C09J 151/06

**Language of the proceedings:** EN

**Title of invention:**

Adhesive polypropylene resin composition and multi-layer laminate body using the resin composition

**Patentee:**

Mitsui Chemicals, Inc.

**Opponent:**

Treofan Germany GmbH & Co. KG

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step (yes) "

**Decisions cited:**

-

**Catchword:**

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Case Number: T 0274/04 - 3.3.09

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.09  
of 20 June 2006

**Appellant:**  
(Opponent)

Treofan Germany GmbH & Co.KG  
Am Prime Parc 17  
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**Representative:**

**Respondent:**  
(Patent Proprietor)

Mitsui Chemicals, Inc.  
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**Representative:**

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**Decision under appeal:**

Decision of the Opposition Division of the  
European Patent Office posted 16 December 2003  
rejecting the opposition filed against European  
patent No. 0758675 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** P. Kitzmantel  
**Members:** N. Perakis  
W. Sekretaruk

## Summary of Facts and Submissions

I. Mention of the grant of European patent No 0758675 in respect of European patent application No 96305967.0 in the name of MITSUI PETROCHEMICAL INDUSTRIES, LTD (now MITSUI CHEMICALS, INC.), which had been filed on 15 August 1996 claiming JP priority of 15 August 1995 (JP 207936/95), was announced on 31 January 2001 (Bulletin 2001/05). The patent, entitled "Adhesive polypropylene resin composition and multi-layer laminate body using the resin composition", was granted with nine claims. Product Claims 1 and 2, relating respectively to an adhesive composition and to a multi-layer laminate body, use Claim 8 and process Claim 9 read as follows:

"1. An adhesive polypropylene resin composition comprising:

(a) 50 to 90 parts by weight of a modified polypropylene or a composition containing a modified polypropylene, the modified polyolefin being graft-modified with at least one monomer selected from unsaturated carboxylic acids and derivatives thereof; and

(b) 10 to 50 parts by weight of a modified polyolefin other than the modified polypropylene or composition (a), modified polyolefin being grafted with at least one monomer selected from unsaturated carboxylic acids and derivatives thereof, wherein the modified polyolefin (b) has:

(i) a density of from 0.860 g/cm<sup>3</sup> to 0.905 g/cm<sup>3</sup>,

(ii) a melt flow rate, at 190°C under a load of 2.16 kg, of from 0.1 to 50 g/10 min., and

(iii) a grafting ratio of from 0.01 to 5% by weight,

and wherein the adhesive polypropylene resin composition has a melt flow rate (ASTM, D1238, 23°C) of from 0.5 to 30 g/10 minutes."

"2. A multi-layer laminate body having at least three laminated layers, which body comprises:

(i) a layer of a polyolefin

(ii) laminated on layer (i) a layer of an adhesive polypropylene resin composition according to claim 1; and

(iii) laminated on layer (ii) a layer of a polyamide resin and/or an ethylene/vinyl alcohol copolymer."

"8. Use of an adhesive polypropylene resin composition for adhering together a polyolefin layer and a layer of a polyamide resin and/or an ethylene/vinyl alcohol copolymer, wherein the adhesive polypropylene resin composition is as described in claim 1."

"9. A process for producing a laminated film which comprises laminating a polyolefin layer, an adhesive polypropylene layer and a polyamide or ethylene/vinyl alcohol polymer layer in a molten state so as to form a laminate body according to claim 2 or claim 3 and drawing the body so as to produce a film oriented in at least one direction."

Claims 3-7 were dependent, either directly or indirectly, on Claim 2.

II. A Notice of Opposition was filed against the patent by Trespaphan GmbH, now Treofan Germany GmbH and Co. KG, on 30 October 2001. The Opponent requested the

revocation of the patent in its full scope, relying on Article 100(a) EPC (lack of novelty and inventive step).

The Opposition was inter alia supported by the following documents:

D1: WO-A-94/12581

D2: US-A-4 561 920

D3: DE-A-2 215 817

D4: US-A-4 762 882

III. By its decision issued in writing on 16 December 2003 the Opposition Division rejected the opposition.

The Opposition Division held in the appealed decision that the subject-matter of the patent was novel over D1 because this document did not disclose the required properties of the modified polyethylene (component (b) of Claim 1) and that the claimed subject-matter also involved an inventive step over the closest prior art D2, because there was no suggestion in the cited prior art of modifying the grafted polypropylene component used according to this document for the inner laminate layer in accordance with the claimed solution in order to improve the adhesive force.

IV. On 24 February 2004 the Opponent (Appellant) lodged an appeal against the decision of the Opposition Division and paid the appeal fee on the same day.

In the Grounds of Appeal filed on 26 April 2004, the Appellant argued that a good adhesion of a polypropylene layer to a polyamide (PA) resin layer and to an ethylene/vinyl alcohol (EVOH) copolymer layer was

not part of the problem underlying Claim 1 and that, in view of this, its subject-matter was obvious over D1 because the parameters of component (b), undisclosed in D1, were usual and did not satisfy the requirements for a selection invention. As to Claim 2, it was obvious to combine D1, which taught a good adhesion to polypropylene of blends of modified polypropylene and modified polyethylene, with D2 which disclosed a good adhesion of modified polyolefins to ethylene/vinyl alcohol copolymer (EVOH). An analogous conclusion of obviousness applied to the aspect of Claim 2 relating to the adhesion between polypropylene and polyamide because D3 disclosed the suitability of modified polyolefins as adhesives for polyolefin layers and polyamide (PA) resin layers. Similar considerations applied to the combination of D1 with D4.

V. In its letter of reply dated 2 September 2004 the Respondent requested that the patent be maintained as granted. The Respondent contested the Appellant's argument that Claims 1 and 2 related to two different inventive concepts and emphasised that, in line with what was set out in the original application, the claimed invention was concerned with laminates comprising polar and non-polar layers, especially from polyamide and EVOH. D1 was therefore an inappropriate starting point and nothing therein would prompt the skilled person to adapt its teaching to this purpose. Even if it would do so, several non-obvious selections were necessary in order to arrive at the claimed adhesives.

VI. On 20 June 2006, oral proceedings were held before the Board.

At the oral proceedings the Appellant acknowledged the novelty of the claimed subject-matter.

As to the issue of inventive step, its arguments may be summarized as follows:

- The inventive concept of Claim 1 was much broader than that of Claim 2. The issue of inventive step should therefore be dealt with differently for the subject-matter of these two claims.

- Document D1 should be considered as the closest prior art not only for Claim 1, with which D1 had the most structural similarities as regards the claimed adhesive composition, but also for Claim 2, as D1 further disclosed the positioning of this adhesive composition between a polypropylene coating and a polyamide (PA) layer.

- No technical effect should be acknowledged for the claimed density value range, as neither was the relevance of density mentioned in the description of the patent in suit nor was there any evidence for an unexpected advantage over the adhesive compositions of D1.

- As the density value range had been limited to the granted range during prosecution of the application before the examining division, it was doubtful whether the examples of the patent in suit fell under the scope of the claims.

- The modified polyethylenes of D1 should be considered as low density polymers because they resulted from the modification of the high density polyethylenes by grafting, a process known to reduce the polymer's density.

VII. The Respondent essentially argued as follows:

- The inventive step of Claims 1 and 2 had to be assessed in the same way, since the patent referred to a single inventive concept, namely the provision of an adhesive composition suitable for bonding polyolefins to polar polymer layers made from polyamide (PA) resins or ethylene/vinyl alcohol (EVOH) copolymers.

- Document D2 should be considered as the closest state of the art as it related to the same technical field as the patent in suit, namely the production of laminates comprising polar and non-polar layers.

- With regard to the definition of the technical problem, this should be taken as the problem cited in the contested patent, i.e. the improved adhesiveness of a polypropylene layer to a polyamide (PA) layer or an ethylene/vinyl alcohol copolymer (EVOH) layer.

- The technical evidence of the patent in suit showed that this technical problem has been solved by the claimed adhesive composition and that this solution was not suggested in any piece of prior art.

- D1, which related to adhesive compositions for polypropylene covered steel pipes, was not the closest state of the art because this was a remote technical



field and because D1 was silent about the problem underlying the patent in suit.

- The possible presence according to D1 of a polyamide resin layer in the coating for pipe joints or welds did not change the above facts.

- In the absence of supporting evidence, the Appellant's argument concerning a possible drop in density occurring on grafting of the high density polyethylenes of D1 was nothing more than an unsubstantiated allegation.

- The density values of the grafted polyethylenes exemplified in the contested patent lay within the density range mentioned in the description of the patent specification.

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

The Respondent requested that the appeal be dismissed.

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Novelty (Article 54 EPC)*

The Board is satisfied that the claimed subject-matter is novel over the cited prior art. The Appellant acknowledged the novelty of the granted claims during

the oral proceedings and thus no further discussion of this issue is necessary.

3. *Inventive step (Article 56 EPC)*

3.1 Closest prior art

3.1.1 In order to identify the closest state of the art to be taken as a starting point in accordance with the problem and solution approach, the boards of the EPO have repeatedly pointed out that the closest prior art for assessing inventive step is normally a prior art document disclosing subject-matter, which, first, is conceived for the same or a similar purpose as the claimed invention and, second, has the most relevant technical features in common (Case Law of the Boards of Appeal of the EPO, 4<sup>th</sup> edition 2001, I.D.3.1).

According to what is set out in the specification, the purpose of the claimed invention is to provide an adhesive polypropylene resin composition suited to adhering together a polyolefin layer such as a polypropylene layer and a layer of a polyamide (PA) resin and/or an ethylene/vinyl alcohol (EVOH) copolymer; the resulting laminate should lend itself to the production of shrink films suitable e.g. for packaging meat (see paragraphs [0002], [0045]).

The fact that the subject-matter of Claim 1 is suitable for the achievement of this purpose is a clear justification for equating such a purpose with the underlying problem. The same applies in the case of laminates of Claim 2, which embody the concrete use of

the adhesive composition of Claim 1 for the desired application.

Therefore, Claims 1 and 2, in spite of their different technical scope, address the same inventive concept, and, in consequence, for their respective assessment of inventive step the same state of the art applies.

3.1.2 Document D2 relates to an adhesive composition effective for adhering a polyolefin layer to an ethylene/vinyl alcohol (EVOH) copolymer (column 3, lines 1-7) and to a composite sheet, combining a first polyolefin layer to an ethylene/vinyl alcohol (EVOH) copolymer layer with an adhesive interposed between these two layers (see column 1, lines 6-12; column 1, line 66 to column 2, line 8; claim 8). The adhesive is selected from the group consisting of maleic anhydride graft-modified polymers, which are effective adhesives for adhering the polyolefin layer to the ethylene/vinyl alcohol (EVOH) layer (column 3, lines 1-13). According to the examples, multi-layer laminate bodies are prepared comprising a layer of polypropylene and a layer of ethylene/vinyl alcohol (EVOH) bound together by an adhesive comprising a maleic anhydride graft-modified polypropylene (column 4, lines 15-41).

Thus, the invention disclosed in D2 has the same purpose as the claimed invention, and this document thus qualifies as the closest state of the art for the assessment of its inventivity.

3.1.3 The Board does not consider D1 to be the closest prior art, contrary to the argumentation of the Appellant, because D1 does not disclose subject-matter, which has

the same purpose or which aims at the same object as the claimed invention.

Document D1 relates to heat-recoverable protective coating layers for pipe joints or welds in combination with a heat-activatable sealant (page 2, lines 8-11), and to adhesive compositions which on the one hand are used to bond a protective coating onto a pipe with a good cathodic disbonding resistance and on the other hand are suitable for use at temperatures up to 110°C (page 3, lines 15-18). The adhesive composition comprises a blend of ethylene polymer, e.g. graft-modified, and of maleic anhydride graft-modified polypropylene (Claims 1 and 3). While, similarly to the claimed invention, D1 discloses an adhesive comprising a blend of (modified) polyolefins, it nevertheless does not qualify as a suitable starting point for the assessment of inventive step of the present invention because it is completely silent about the latter's central purpose, namely the provision of a good bonding between an (unpolar) polyolefin layer and a (polar) layer of polyamide or EVOH.

The Appellant referred to page 9, lines 8 to 10, of D1, where it is set out that "For example, many conventional heat-recoverable sleeves are coated with a layer of polyamide which lies between the backing layer of the sleeve and the adhesive of the composition" and argued that this passage pointed towards the use of the adhesive for the combination of polyolefin and polyamide layers. While, admittedly, this passage can be interpreted as suggesting the use of the specified adhesive composition between a polypropylene layer and a polyamide surface, it would not lead the skilled

reader to take it as a starting point for the solution of the present technical problem, because nowhere in the whole specification of D1, a document concerned with the improvement of pipe joints, is there any suggestion of the suitability of the adhesive composition for the purpose of combining polar and non-polar materials, suitable for the production of laminates for use e.g. as packaging material.

3.2 Problem to be solved and its solution

3.2.1 The subject-matter of claim 1 of the patent in suit differs from the disclosure of D2 (column 3, lines 1-13, and the examples) in that the adhesive composition comprises not only a single maleic anhydride modified polyolefin, only modified polypropylene being exemplified, but also in combination therewith a second modified polyolefin component different from the first one, which latter component is characterised by the ranges of density, melt flow rate and grafting ratio specified in Claim 1.

3.2.2 The patent in suit states that, with regard to the existing prior art, there was a need for an improved adhesive polypropylene resin composition suitable for adhering together a polyolefin layer (a non-polar layer) and a layer of a polyamide (PA) resin layer and/or an ethylene/vinyl alcohol (EVOH) layer (a polar layer), which adhesive composition would offer excellent adhering force to the mentioned layers in both an undrawn and a drawn state, this being the technical problem to be solved by the invention (paragraphs [0002] to [007], [0028], [0029], [0042], [0043]).

3.2.3 The experimental evidence in the patent specification shows that the adhesive compositions according to the invention (table 1) compared to the adhesive compositions according to D2 (table 2, particularly comparative example 1) improve the adhering force between a polar layer (either a PA layer or an EVOH layer) and a non-polar layer (polypropylene layer).

The Board therefore accepts that the above technical problem has effectively been solved by the subject-matter of Claims 1 and 2.

This conclusion is not affected by the missing information in these examples of the density of the maleic anhydride graft-modified ethylene/ $\alpha$ -olefin copolymer component of the tested adhesive composition. In the Board's judgment it is plausible, in the absence of convincing counter-evidence, that the density of this copolymer should lie within the range specified in Claim 1 (see also description, paragraph [0016]), which corresponds to the preferred density range of the originally filed application (page 4, line 10). Moreover, the Board accepts the Respondent's argument, that if the improvement shown in the examples is observed over the initial broader density range, it should also be observed over the claimed, more restricted, density range.

### 3.3 Obviousness

The remaining question is thus whether the prior art suggests to a person skilled in the art the solution of the existing technical problem in the way proposed by Claims 1 and 2.

3.3.1 In the Board's judgment, a skilled person starting from the adhesive composition of D2 would not arrive at the claimed composition in an obvious manner.

As identified above, the additional feature of a further modified polyolefin different from that of D2 and having a density of from 0.860 g/cm<sup>3</sup> to 0.905 g/cm<sup>3</sup>, a melt flow rate at 190°C under a load of 2.16 kg of from 0.1 to 50 g/10 min. and a grafting ratio of from 0.01 to 5% by weight is not disclosed in any of the cited documents, including D1 the document on which the Appellant mainly relied.

The Board has examined this document with regard to the modified polyethylenes and has found neither any disclosure of the above mentioned properties nor any value of density, which, according to the argumentation of the Appellant, was the sole distinguishing feature between the modified polyethylenes of D1 and the corresponding modified polyolefin component according to present Claim 1. The only reference to this property in D1 is confined to page 13 (first component of the table and line 7), where the modified HDPE (high density polyethylene) Plexar<sup>®</sup> 013 is mentioned. However, having regard to its higher density this HDPE must be different from the very low density polyolefin components used according to the claimed invention.

Likewise, the Appellant's argument put forward for the first time during the oral proceedings before the Board, namely that by the graft modification of the HDPE its density would be lowered into the very low density range specified in present Claim 1, is dismissed in the

absence of any corroborating evidence as being mere unfounded allegation.

Thus even if the skilled person were to consider the disclosure of D1, even though this document relates to the rather remote technical area of pipe joints, it would not, by combining its teaching with the disclosure of D2, arrive at the claimed invention. Moreover, it could not derive any motivation from either D1 or D2 to substitute the very low density polyolefin of the claimed adhesive composition for the HDPE used according to D1.

### 3.3.2 Documents D3 and D4

D3, in the Board's view, could possibly be considered as an alternative closest prior art document for the subject-matter of Claims 1 and 2.

D3 discloses a container with a three layer structure. The three successive layers are: a non-modified polyolefin layer, a modified polyolefin layer and a polyamide layer (page 8, second paragraph to page 9, first paragraph). D3 addresses the technical problem of enhanced adhesion of a (polar) polyamide layer to a (non-polar) polyolefin layer (page 1, lines 1-5) which is solved by the use of a modified polyolefin layer (page 8, line 33 to page 9, line 10). Document D3, like document D2, does not disclose that the adhesive modified polyolefin layer may comprise a second, different, modified polyolefin in addition to the (first) modified polyolefin in order to further enhance the adhesion. Consequently, in the same manner as set out for D2, the person skilled in the art would not



contemplate the combination of D3 with D1, and even if he did so, he would not arrive at the claimed invention.

The relevance with regard to D1 and/or D2 of document D4, although cited by the Appellant, has not been discussed in any detail. D4 discloses a modified polyolefin resin having a specific density which overlaps with the low density component (b) of Claim 1 (abstract; column 3, lines 1-35). D4 further discloses that this modified polyolefin resin provides excellent adhesion to polar layers, either EVOH or PA (column 7, lines 1-51). However, there is no information in D4 either as to the resin's adhering power to non-polar polyolefins, or to a possible combination of this resin with another modified polyolefin in order to develop an adhesive composition suited to solve the existing technical problem. For the skilled person, seeking to solve this problem, this document does not lend itself, therefore, to a combination with any of the other citations.

#### 3.4 Conclusion

In the circumstances, the adhesive polypropylene resin composition of Claim 1 and the multi-layer laminate body of Claim 2 involve an inventive step.

The same applies to the use according to independent use Claim 8 because it relates to a use of the composition of Claim 1.

The same applies also to the process according to the independent Claim 9 because the process steps defined

in Claim 9 lead to a multi-layer laminate body falling within the scope of Claim 2.

Hence, the ground of opposition under Article 100(a) EPC does not prejudice the maintenance of the patent as granted.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

G. Röhn

P. Kitzmantel