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**Datasheet for the decision
of 15 June 2026**

Case Number: T 0906/24 - 3.3.09

Application Number: 18720830.1

Publication Number: 3606749

IPC: B32B27/08, B32B27/32, B32B7/02

Language of the proceedings: EN

Title of invention:

POLYETHYLENE LAMINATES FOR USE IN FLEXIBLE PACKAGING MATERIALS

Patent Proprietor:

Dow Global Technologies LLC

Opponent:

Abu Dhabi Polymers Company Limited
(Borouge) LLC

Headword:

Polyethylene Laminates/DOW

Relevant legal provisions:

EPC Art. 54(2), 56, 83

Keyword:

Auxiliary request 2: Sufficiency of disclosure, Novelty,
Inventive Step - (yes)

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 0906/24 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 15 June 2026

Appellant:

(Opponent)

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Decision under appeal:

**Interlocutory decision of the Opposition
Division of the European Patent Office posted/
electronically transmitted on 7 May 2024
concerning maintenance of the European Patent
No. 3606749 in amended form.**

Composition of the Board:

Chairman	A. Haderlein
Members:	A. Veronese
	L. Basterreix

Summary of Facts and Submissions

- I. The appeal was filed by the opponent against the opposition division's decision finding that the European patent as amended in accordance with auxiliary request 3 met the requirements of the EPC.
- II. With its notice of opposition the opponent had requested that the patent be revoked in its entirety on the grounds under Article 100(a) EPC (lack of novelty and lack of inventive step) and Article 100(b) EPC.
- III. Claim 1 as granted reads:

1. A laminate structure comprising:

*a sealant film comprising ethylene-based polymer;
a print film laminated to the sealant film, the
print film comprising at least 3 layers and having
an overall thickness from 15 to 30 μm , where the
print film comprises a middle layer, an inner layer
disposed between sealant film and the middle layer,
and an outer layer, wherein*

*the middle layer comprises at least 90% by weight
high density polyethylene (HDPE) having a density
from 0.950 to 0.965 g/cc and a melt index (I_2) from
0.1 to 20 g/10 min, wherein density is measured
according to ASTM D792, Method B and I_2 is measured
according to ASTM D1238 at 190°C and 2.16 kg load;*

*the inner layer comprises linear low density
polyethylene (LLDPE) having a density from 0.925 to*

0.965 g/cc and a melt index (I_2) from 0.1 to 20 g/10 min; and

the outer layer comprises linear low density polyethylene (LLDPE) having a density from 0.925 to 0.965 g/cc and a melt index (I_2) from 0.1 to 20 g/10 min;

wherein the laminate structure exhibits a gloss value of at least 40%, wherein gloss is measured at 45° according to ASTM D2457.

IV. Claim 1 of auxiliary request 3 found allowable by the opposition division differs from claim 1 as granted in that the thickness of the print film comprising three layers has a thickness "*from 15 to less than 25 μm* " and in that "*the print film defines a ratio by layer thickness of 1:1:1 to 1:5:1 for the inner layer, middle layer, and outer layer, respectively*".

V. The documents submitted during the opposition included:

D2: US 2016/0339663 A1

D3: WO 2008/034630 A1

VI. In its decision, the opposition division found that:

- The print layer of claim 1 as granted comprised three distinguished layers, an "inner layer", a "middle layer" and an "outer layer".
- The claimed linear low density polyethylene (LLDPE) having a density within the range 0.925-0.965 g/cm³ was a linear ethylene- α -olefin copolymer obtained in accordance with the teaching of the description and common general knowledge. However, the claimed

range encompassed density values typical of high density polyethylene (HDPE), rather than of LLDPE.

- The claimed HDPE included linear ethylene homopolymers. In so far as the HDPE was concerned, the claimed density range of 0.950 to 0.965 g/cc was that typical for these polymer types.
- The claimed invention was sufficiently disclosed. The skilled person would have been able to provide the polymer identified as "LLDPE" in claim 1. They would also have been able to prepare a laminate structure having the claimed gloss. Paragraph [0023] of the patent mentioned LLDPE polymers suitable to prepare the claimed structure. The skilled person would have been able to avoid non-working embodiments.
- The laminate structure claimed in the patent as granted was novel over the structures disclosed in D2 and D3, at least because these did not comprise a print layer comprising three distinguishable layers. However, the claimed laminate did not involve an inventive step over the teaching of D2, the closest prior art. The same finding applied to the subject-matter of auxiliary requests 1 and 2.
- Auxiliary request 3 was admitted, being filed in reply to the opposition division's change of opinion in regard to the main request. It met the requirements of Rule 80 and Articles 123(2) and (3) EPC. The claimed laminate structure, like that of the main request, was sufficiently disclosed and novel over the cited prior art. Furthermore, it involved an inventive step over D2, the closest prior art.

- VII. In its statement setting out the grounds of appeal the appellant contested the opposition division's findings and requested that the decision be set aside and the patent revoked.
- VIII. In its reply to the statement setting out the grounds of appeal, the patent proprietor (respondent) addressed the appellant's objections and requested that the appeal be dismissed or, alternatively, that it be maintained on the basis of one of auxiliary requests 1 to 4, filed with that reply.
- IX. Claim 1 of auxiliary request 2 reads:

"1. A laminate structure comprising:

*a sealant film comprising ethylene-based polymer;
a print film laminated to the sealant film, the
print film comprising at least 3 layers and having
an overall thickness from 15 to less than 25 μm ,
where the print film comprises a middle layer, an
inner layer disposed between sealant film and the
middle layer, and an outer layer, wherein*

*the middle layer comprises at least 90% by weight
high density polyethylene (HDPE) having a density
from 0.950 to 0.965 g/cc and a melt index (I_2) from
0.1 to 20 g/10 min, wherein density is measured
according to ASTM D792, Method B and I_2 is measured
according to ASTM D1238 at 190°C and 2.16 kg load;*

*the inner layer comprises linear low density
polyethylene (LLDPE) having a density from 0.930 to
0.940 g/cc and a melt index (I_2) from 0.1 to 20 g/
10 min; and*

the outer layer comprises linear low density polyethylene (LLDPE) having a density from 0.930 to 0.940 g/cc and a melt index (I₂) from 0.1 to 20 g/10 min;

wherein the laminate structure exhibits a gloss value of at least 40%, wherein gloss is measured at 45° according to ASTM D2457; and

wherein the print film defines a ratio by layer thickness of 1:1:1 to 1:5:1 for the inner layer, middle layer, and outer layer, respectively."

- X. In a communication issued under Article 15(1) RPBA, the board expressed the preliminary opinion that the invention defined in the main request and in auxiliary request 1 was insufficiently disclosed. Furthermore, it expressed the opinion that the outstanding objections did not prejudice maintenance of the patent on the basis of auxiliary request 2 and that the description had to be adapted to the claims of that request.
- XI. In reply to the board's communication the appellant conditionally withdrew its request for oral proceedings on condition that the patentee withdrew its main request and auxiliary request 1, and that current auxiliary request 2 became its main request.
- XII. The respondent stated that, on condition that the board maintained its provisional opinion, the main request and auxiliary request 1 were withdrawn and auxiliary request 2 became its main request. On that basis, the requests for oral proceedings were also withdrawn. Amended paragraphs of the description in conformity with auxiliary request 2 were also annexed.

- XIII. Taking into account the parties' requests, the board cancelled the scheduled oral proceedings.

Requests

- XIV. The opponent (appellant) requested that the patent be revoked.
- XV. The patent proprietor (respondent) requested that the patent be maintained on the basis of the main request, filed as auxiliary request 2 with its reply to the statement setting out the grounds of appeal.

Reasons for the Decision

Main request

The main request corresponds to auxiliary request 2 filed by the respondent with its reply to the statement setting out the grounds of appeal.

1. *Claim construction and sufficiency of disclosure*
- 1.1 When discussing the main request filed with the statement setting out the grounds of appeal, the appellant contested the opposition division's finding that the print layer defined in claim 1 comprised an inner layer, a middle layer and an outer layer, each of these layers being separate and distinguishable.
- 1.2 Moreover, the appellant argued that the density of the LLDPE inner and outer layers, from 0.925 to 0.965 g/cc, encompassed values characteristic of HDPE polymers, rather than LLDPE polymers. For this reason, it would

have been impossible to prepare LLDPE polymers having a density of 0.965 g/cc. Consequently, contrary to the opposition division's finding, the invention was insufficiently disclosed.

- 1.3 The appellant's arguments were based on the fact that claim 1 of the previous main request encompassed print films in which the inner, middle and outer layers consisted of the same material and possessed the same density. Furthermore, they were based on the fact that claim 1 provided LLDPE polymers having a very high density, typical of HDPE polymers, rather than of LLDPE polymers.
- 1.4 Claim 1 of the new main request has been amended by limiting the ranges defining the density of the LLDPE inner and outer layers to values of from 0.930 to 0.940 g/cc. These values - which are those characterising LLDPE polymers - differ from those of the HDPE middle layer, namely 0.950 to 0.965 g/cc. Consequently, the amendment renders the three claimed layers distinct and distinguishable and excludes from the claimed scope LLDPE polymers which could otherwise be considered HDPE polymers.
- 1.5 Hence the appellant's aforementioned objections are moot. The board considers that, relying on the teaching of the patent and common general knowledge, the skilled person would be able to prepare a structure containing a print film including the three distinguished layers specified in claim 1. Hence the claimed invention is sufficiently disclosed.

2. *Novelty*

2.1 The appellant contested the opposition division's finding that the laminate structure claimed in the request considered allowable in the decision under appeal was novel over Sample 4.1, described in Table 4 of D2. In so far as the appellant's arguments can be transposed to the current main request, the following is to be considered.

2.2 The appellant's argument relied on the following assumptions:

- that the gloss of the layer ZN-1 of the structure of Sample 4.1 fell within the claimed range
- that claim 1 of the opposed patent did not require that the print film be made of at least three distinct layers
- that the ZN-1 layer in Sample 4.1 represented both the middle and the outer layer of the print film of claim 1 (and the ZN-2 represented the inner layer of that print film)

2.3 These assumptions are not convincing.

2.4 In the first place, the assumption that Sample 4.1 - which comprises an outer layer ZN-1 made of a polymer having a high density - has the claimed (high) gloss of at least 40% is unsubstantiated.

2.5 Furthermore, as already mentioned above, claim 1 defines a print film comprising three distinct and distinguishable layers: an inner, a middle and an outer layer. The print film of the laminate structure of

Sample 4.1 does not contain these three layers. There is plainly no middle layer in the print film of this sample. Only two layers are present.

- 2.6 Consequently, the appellant's assertions that "...the middle and outer layer can be the same. We can nominally treat the ZN-1 layer as two layers..." and that "The print film in Sample 4.1 of D2 is conceptually made up therefore of two identical layers and one different layer" are not persuasive.
- 2.7 This means that D2 does not disclose the laminate structure defined in claim 1. Consequently, the claimed laminate structure is novel over the teaching of this document.
3. *Inventive step*
- 3.1 The appellant disagreed with the opposition division's finding that the laminate structure claimed in the request considered allowable in the decision under appeal involves an inventive step over the teaching of D2. In so far as the appellant's arguments can be transposed to the current main request, they are not convincing, for the following reasons.

Closest prior art

- 3.2 The claimed invention relates to polyethylene laminate structures used in flexible packaging materials. It focuses, in particular, on a polyethylene laminate structure suitable for flexible packaging that achieves recyclability while also obtaining barrier protection and printing properties. The structure must be printable and have a sufficient stiffness not to

stretch during high speed printing (see paragraphs [0001] to [0008] of the opposed patent).

- 3.3 The opposition division decided, and the parties did not dispute, that D2 was the closest prior art. Like the opposed patent, D2 discloses laminate structures made of LLDPE and HDPE polymer layers suitable for packaging consumer goods. Like those of the patent, the structures of D2 are meant to be recyclable, to have good mechanical and optical properties and to be printable. Thus there are no reasons to diverge from the opposition division's finding that D2 is the closest prior art.
- 3.4 As noted by the respondent in paragraphs 115 to 126 of its statement setting out the grounds of appeal, the appellant drew attention to several parts of D2 and suggested that the *"whole content of D2 should be considered, and it is clear that what is claimed in claim 1 of the Opposed Patent is contemplated in D2"*. However, in these paragraphs the appellant failed to identify a specific embodiment or example from which to start the inventive-step analysis.
- 3.5 It was only in paragraph 127 that the appellant suggested that the laminate structure identified as "Sample 4.1" in Table 4 of D2 was the closest to the invention claimed in the opposed patent. Sample 4.1 comprises an inner (sealant) film and an outer print film made of two layers: ZN-1(nuc)/ZN-2. In this structure the ZN-2 layer is the inner layer, which is in contact with the film forming the sealant structure.
- 3.6 As suggested by the respondent, this specific laminate structure can be considered the starting point for assessing inventive step.

Distinguishing features

- 3.7 Referring to Table 2 of D2, the appellant submitted that the total thickness of the ZN-1(nuc)/ZN-2 print film of Sample 4.1 was 23.37 μm . This value was calculated from the thickness of 0.92 mils indicated for the film 2.4 in Table 2, assuming that the thickness of the ZN-1(nuc)/ZN-2 film in Table 2 was the same as that of the outer print film in the laminate 4.1 of Table 4 (1 mil corresponds to around 25.4 μm).
- 3.8 The respondent disputed the appellant's calculations. However, as proposed by the respondent, and to the appellant's benefit, for the sake of argument in the following it will be assumed that the thickness of the ZN-1(nuc)/ZN-2 print film of Sample 4.1 is 23.37 μm and falls within the claimed range.
- 3.9 Based on these assumptions, the claimed laminate structure differs from that of Sample 4.1 at least in that:
- the print film comprises at least three layers, namely an inner, a middle and an outer layer (the print layer of Sample 4.1 has two layers and does not contain the outer layer of claim 1), wherein:
 - the three-layered film has a thickness of 15 to 25 μm and the ratio between the thickness of the inner, middle and outer layers is within 1:1:1 to 1:5:1, and
 - the claimed gloss parameter is more than 40%: this is because it cannot be assumed that Sample 4.1,

having an outer layer having a density of 0.958, has a high gloss, namely of more than 40%.

Technical effect

- 3.10 The laminate structure of Example 1 of the opposed patent, which comprises an LLDPE polymer (DOWLEX 2038.68G, having a density within the claimed range), has a gloss of 49% (see Tables 1 and 6). According to the appellant's submissions, which were not contested, the gloss of the structure of example 2, which comprises another LLDPE polymer having the claimed density (DOWLEX 2036G-100), is also above 40%. This makes it credible that the claimed laminate structure has a higher gloss and an improved appearance compared with that of Sample 4.1 of D2, which comprises an outer layer (ZN-1(nuc)) made of a polyethylene having a high density (0.958 g/cc). The teaching of paragraph [0056] and Table 6 also makes it credible that the mechanical properties of the claimed film are adequate for the structure to be printed at high speeds without stretching and to be used for packaging purposes.

Objective technical problem

- 3.11 In view of the aforementioned considerations, the underlying problem is the provision of a film having adequate mechanical properties to be printed at high speeds without stretching and to be used for packaging purposes which exhibits improved optical properties.

Non-obviousness of the proposed solution

- 3.12 The core of the inventive-step discussion concerns the three-layer structure of the print film in combination with the claimed layer ratio and layer thicknesses.

- 3.13 In view of the teaching of D2 already mentioned above, when confronted with the underlying problem the skilled person would have considered adding a further external layer comprising an LLDPE polymer, i.e. an additional ZN-2 layer as described in D2, on top of the ZN-1 layer of Sample 2.4.
- 3.14 As noted by the respondent, while it is assumed that the two-layer print film of Sample 4.1 of D2 has a thickness within the claimed range, the relevant question is what would be the thickness of the print film if a further, additional, ZN-2 outer layer were added. In other words, if Sample 4.1 were modified to make it a three-layer print film with an outer layer ZN-2.
- 3.15 The appellant's suggestion that "the thickness isn't actually a new feature as it is present in the prior art" is not convincing, because what is disclosed in D2 is the thickness of a two-layered film, not a three-layered one. When modifying Sample 4.1 by adding a new ZN-2 outer layer, the layer ratio and the overall thickness requirements still need to be satisfied.
- 3.16 As noted by the respondent, the claimed features - the at least three layers, the layer ratios and the overall thickness - cannot be considered in isolation. All three of these requirements need to be met. This means that, if Sample 4.1 is modified by the addition of an outer layer ZN-2, the layer ratio and the overall thickness requirements still need to be satisfied.
- 3.17 In paragraphs 123 and 149 of its statement setting out the grounds of appeal, the appellant referred to paragraph [0218] of D2. This teaches that the thickness

of the outer web A (the print layer) is from about 1 to about 1.4 mils (i.e. from 25.4 to 35.6 μm), and that of the inner web from about 2 to about 3 mils (i.e. from 50.8 to 76.2 μm). This means that D2 points to a print film that is thicker than the claimed one, which has a thickness of from 15 to 25 μm . The argument that a thickness of 25.4 μm cannot be distinguished from one below 25 μm is not persuasive either.

- 3.18 According to paragraph [0234] of D2, the thickness ratio between the two layers of the outer film structures in Table 2 is 0.75:0.4 (ZN-1:ZN-2). The thickness of outer films 2.10, 2.13 and 2.15 which have a ZN-1/ZN-2 structure in Table 2 of D2 is at least 0.85 mils.
- 3.19 Based on the layer ratio from paragraph [0234], this means that for the 0.85 mil thick outer webs of Samples 2.10, 2.13 or 2.15 there is: 0.517 mils ZN-1 + 0.296 mils ZN-2. Thus a three-layer outer web structure ZN-2/ZN-1/ZN-2 would have a thickness of 0.296 mils ZN-2 + 0.517 mils ZN-1 + 0.296 mils ZN-2. This results in a total thickness of 1.11 mils, i.e. 28.2 μm .
- 3.20 Claim 1 is limited to an overall thickness of the print film of 15 to less than 25 μm in combination with a ratio by layer thickness of 1:1:1 to 1:5:1 for the inner layer, middle layer and outer layer, respectively. The stipulated layer thickness ratio means that, when modifying the finished laminate of Sample 4.1 in Table 4 of D2, which has a two-layer print outer web ZN-1/ZN-2, the thickness of any added third, outer print layer would have to be the same thickness as the existing inner print layer.

- 3.21 Consequently, as correctly already noted in the decision, this would result in an overall print film thickness which is higher than that specified in claim 1. Thus, even assuming that the skilled person would have considered adding an additional layer ZN-2 to Sample 4.1, they would not have arrived at the structure of claim 1.
- 3.22 The appellant argued that the skilled person would also have considered adding a ZN-2 layer, while maintaining the total thickness of the print film. This could be done by decreasing the thickness of the ZN-1 middle layer or of the ZN-2 outer and inner layers. The appellant conceded that this could have caused a decrease in stiffness. However, in its opinion, this was *"a choice - a trade off - that all manufacturers make every day"*. Thus this was a trivial modification which did not involve an inventive step.
- 3.23 These arguments are not convincing.
- 3.24 Notwithstanding that the modification of Sample 4.1 by the addition of further layer ZN-2 is already a major step for the skilled person, there is nothing in D2 that would motivate them not only to modify the finished laminate of Sample 4.1 but also to adapt the final thickness of the modified print film so that it falls within the claimed range of from 15 μm to less than 25 μm .
- 3.25 It is noted that paragraph [0218] of D2 states that the outer web (the printed film of the claimed invention) may have a thickness of 1 to 1.4 mils (25.4 to 35.6 μm). This provides a pointer to two-layered films having a higher, rather than a lower, thickness than that (23.37 μm) of Sample 4.1. Adding a further layer

to these films would result in the formation of three-layered print films with a thickness which far exceeds the claimed one. Thus D2 does not provide any incentive for the skilled person to reduce the overall thickness to less than 25 μm when incorporating the suggested third, outer print layer.

- 3.26 Furthermore, as noted by the respondent and explained in the decision under appeal, Sample 4.1 in Table 4 of D2 includes a machine direction oriented print (outer) web. The described laminate structure is assessed for mechanical properties, i.e. stiffness/rigidity. The skilled person would therefore be reluctant to reduce the thickness of the print film and to alter its mechanical properties.
- 3.27 Consequently, without any pointer to thinner films in D2, the skilled person would, at most, have used the films which are described in this document to modify the structure of Sample 4.1. As explained above, by doing this the skilled person would have arrived at a laminate structure which differs from the claimed one.
- 3.28 For these reasons, the claimed laminate structure involves an inventive step over the teaching of D2.
- 3.29 As a corollary, it is noted that the same conclusions would be arrived at even if the problem were formulated as providing an alternative laminate structure.
4. *Amendments to the description*
- 4.1 The respondent filed amended paragraphs [0007], [0015], [0019], [0021] and [0028] of the description, adapted to the claims of the main request. The board does not see any reason to object to the amendments made.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of:
 - Claims 1 to 14 of the main request, filed as auxiliary request 2 with the respondent's reply to the statement setting out the grounds of appeal.
 - The description of the patent as granted, with paragraphs [0007], [0015], [0019], [0021] and [0028] being amended in accordance with the revised version filed by the respondent by letter of 29 May 2026.

The Registrar:

The Chairman:



K. Götz-Wein

A. Haderlein

Decision electronically authenticated