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**Datasheet for the decision
of 8 October 2019**

Case Number: T 1073/16 - 3.3.09

Application Number: 09722098.2

Publication Number: 2256150

IPC: C08J5/04, C08L23/02, C08L23/12

Language of the proceedings: EN

Title of invention:

LONG-FIBER-REINFORCED RESIN COMPOSITION AND MOLDED ARTICLE
THEREOF

Patent Proprietor:

Prime Polymer Co., Ltd.

Opponent:

Borealis AG

Headword:

Relevant legal provisions:

RPBA Art. 13(1)
EPC Art. 100(a), 56

Keyword:

Inventive step - obvious alternative

Decisions cited:

Catchword:



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Case Number: T 1073/16 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 8 October 2019

Appellant: Prime Polymer Co., Ltd.
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 8 March 2016
revoking European patent No. 2256150 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman W. Sieber
Members: M. Ansorge
 D. Rogers

Summary of Facts and Submissions

- I. This decision concerns the appeal lodged by the proprietor against the decision of the opposition division revoking European patent No. 2 256 150.
- II. With its notice of opposition, the opponent had requested revocation of the patent in its entirety on the grounds of opposition under Article 100(a) EPC (lack of novelty and lack of inventive step) and Article 100(b) EPC.
- III. The documents submitted during the opposition proceedings included:
- D1: JP 2004-300293
 - D1a: English translation of D1
 - D2: WO 2005/075554 A1
 - D2a: English translation of D2
 - D8: Declaration of Mr. Odawara, which contains experiments to demonstrate an improved tensile breaking strength and improved flexural strength (filed on 23 December 2015).
- IV. The opposition division's decision was based on the main request and auxiliary requests 1 to 7.

The **main request** consisted of the granted claims and an amended paragraph [0042] of the patent specification.

Claim 1 of the **main request** reads as follows:

"A long-fiber-reinforced resin composition comprising the following component (A) and the component (B),

the content of the component (A) being 50 to 90 wt% and the content of the component (B) being 10 to 50 wt%; and the content of reinforcing fiber contained in the component (A) being 20 to 60 wt% relative to the total amount of the fiber-reinforced resin composition:

[Component (A)]

a long-fiber-reinforced thermoplastic resin pellet comprising a thermoplastic resin, a modified polyolefin-based resin modified with an unsaturated carboxylic acid or its derivative and reinforcing fiber and satisfying the following (A-1) to (A-5):

- (A-1) the melt index of the thermoplastic resin (resin temperature: 230°C, load: 21.18 N) is 100 to 250 g/10 min;
- (A-2) the relaxation time A [*sic*] of the thermoplastic resin at an angular frequency $\omega=1$ (rad/sec) calculated from the storage modulus G' and the loss modulus G'' measured by means of a cone-and-plate rheometer is 0.1 (sec) or less;
- (A-3) the content of the reinforcing fiber is 40 to 70 wt%;
- (A-4) the content of the modified polyolefin-based resin is 1 to 5 wt%; and
- (A-5) the added amount of carboxylic acid in the modified polyolefin-based resin is 0.1 to 14 wt%;

[Component (B)]

a polyolefin-based resin satisfying the following (B-1) and (B-2):

- (B-1) the melt index of the polyolefin-based resin (resin temperature: 230°C, load: 21.18 N) is 20 to 70 g/10 min; and

(B-2) the relaxation time λ of the polyolefin-based resin at an angular frequency ω [sic] $\omega=1$ (rad/sec) calculated from the storage modulus G' and the loss modulus G'' measured by means of a cone-and-plate rheometer is 0.23 (sec) or less."

The exact wording of **auxiliary requests 1, 3 and 5 to 7** is not relevant for the present decision.

Claim 1 of **auxiliary request 2** differs from claim 1 of the main request in that the content of the modified polyolefin-based resin in feature (A-4) was amended to "**1.5** to 5 wt%" (originally it was "1 to 5 wt%").

Claim 1 of **auxiliary request 4** differs from claim 1 of the main request in that the content of the modified polyolefin-based resin in feature (A-4) was amended to "1 to **3.5** wt%".

V. The opposition division revoked the patent and decided, amongst others, that:

- the subject-matter of claim 1 of the main request and auxiliary requests 1 and 4 to 7 was not novel in view of D1a; and
- the subject-matter of claim 1 of auxiliary requests 2 and 3 did not involve an inventive step in view of D1a as the closest prior art.

VI. In its statement setting out the grounds of appeal dated 18 July 2016, the proprietor (hereinafter referred to as "the appellant") requested that the decision be set aside and that the patent be maintained on the basis of the main request as defended before the opposition division (including the deletion of the

words "or melt kneading" in paragraph [0042]) or one of the nine auxiliary requests, all requests filed with said letter. The letter included also a further declaration.

D10: Declaration of Mr. Odawara dated 7 July 2016.

VII. In its reply dated 30 November 2016, the opponent (hereinafter referred to as "the respondent") requested that the appeal be dismissed. In addition, documents D11 and D12 were filed.

D11: EP 2 345 689 A1

D12: Declaration of Mr. Gahleitner.

VIII. With its letter of 1 December 2017, the appellant presented a new set of requests which replaced those previously on file. The new main request was that the patent be maintained as granted (i.e. without the amendment to paragraph [0042]) or on the basis of the claims of auxiliary requests 1 to 6 submitted therewith. A further declaration (D13) was filed too.

D13: Declaration of Mr. Odawara, not dated.

IX. In preparation to the oral proceedings, the board issued a communication giving a preliminary opinion. Amongst others, it was indicated that the board was of the preliminary opinion that the main request of 1 December 2017 should not be admitted into the proceedings.

X. Moreover, the appellant filed a further declaration D19 (by letter of 30 September 2019).

D19: Declaration of Mr. Odawara of 26 September 2019.

XI. On 8 October 2019, oral proceedings took place before the board.

During the discussion of the admission of the appellant's main request (maintenance of the patent as granted), it withdrew this request and replaced it with a new main request consisting of claims 1 to 4 as granted with paragraph [0042] of the patent specification amended so as to delete the words "or melt kneading" (in line with the initial main request filed with the statement setting out the grounds of appeal). Auxiliary requests 1 to 6 as filed on 1 December 2017 were maintained.

The respondent requested that the appeal be dismissed and that the (new) main request, auxiliary requests 3 to 6 and D10, D13 and D19 not be admitted into the proceedings.

XII. The requests of the appellant, insofar as relevant for the present decision, are as follows:

Claim 1 of the **main request** is identical to claim 1 defended before the opposition division, i.e. claim 1 as granted (see point IV, above).

Claim 1 of **auxiliary request 1** corresponds to claim 1 of auxiliary request 2 before the opposition division where the content of the modified polyolefin-based resin in feature (A-4) was amended to "**1.5** to 5 wt%".

Claim 1 of **auxiliary request 2** corresponds to auxiliary request 4 before the opposition division where the content of the modified polyolefin-based resin in feature (A-4) was amended to "1 to **3.5** wt%".

The exact wording of claim 1 of **auxiliary requests 3 to 6** is not relevant for the present decision. However, in claim 1 of each of those auxiliary requests, feature (B-2) was further limited in that the original numerical range "0.23 (sec) or less" was restricted to "**0.2** (sec) or less" or "**0.20** (sec) or less", respectively.

XIII. The arguments of the appellant, insofar as relevant for the present decision, are as follows:

- The (new) main request should be admitted into the proceedings, since it is in line with the main request filed with the statement setting out the grounds of appeal and the same subject-matter had been discussed before the opposition division. Thus, the respondent could not be taken by surprise. Auxiliary requests 3 to 6 should be admitted as well, as those requests contain straightforward limitations in component (B) and it is relied only on effects which can be taken from the patent itself.
- D10, D13 and D19 should be admitted into the proceedings.
- The claimed subject-matter of auxiliary requests 1 and 2 involves an inventive step in view of D1a as the closest prior art.

XIV. The arguments of the respondent, insofar as relevant for the present decision, are as follows:

- The (new) main request and auxiliary requests 3 to 6 as well as D10, D13 and D19 should not be admitted into the proceedings.

- The claimed subject-matter of the auxiliary requests 1 and 2 does not involve an inventive step in view of D1a as the closest prior art.

Reasons for the Decision

MAIN REQUEST

1. Admission of the (new) main request

With its statement setting out the grounds of appeal, the appellant initially requested that the main request as defended before the opposition division (including an amended paragraph [0042]) be the main request in the appeal too. More than one year later, it withdrew said initial main request and replaced it by a new main request (maintenance of the patent as granted, i.e. without any amendment to paragraph [0042]). During the course of the oral proceedings before the board, the appellant withdrew said main request and reverted to its initial main request filed with the statement setting out the grounds of appeal.

In the present case, the appellant has voluntarily withdrawn its initial main request and replaced it by a new main request. Despite a negative preliminary opinion of the board indicating that the pending main request was unlikely to be admitted into the proceedings (see section 4.2 of the communication of the board dated 3 July 2019), the appellant did not react. It was only during the oral proceedings that the appellant reverted to its initial main request.

In the board's view, waiting till the last minute to react to the respondent's and the board's objections, is not the proper behaviour of an appellant in appeal proceedings, and is contrary to the need for procedural economy. Therefore, the board exercised its discretion

under Article 13(1) RPBA not to admit said (new) main request into the proceedings.

AUXILIARY REQUEST 1

2. Novelty

The respondent did not raise any novelty objection against the claimed subject-matter, neither did the board see any reason to raise such an objection on its own motion.

3. Inventive step

3.1 There was agreement among the parties that:

- D1a is the closest prior art in the present case; and
- example 8 of D1a is the embodiment coming closest to the claimed subject-matter.

3.2 Example 8 of D1a discloses a long-fiber-reinforced resin composition which contains long-fiber-reinforced resin pellets (equivalent to component (A) of claim 1) and a polyolefin based resin (equivalent to component (B) of claim 1). The weight ratio between the two components is 80/20 (table 3).

The amount of the modified polyolefin-based resin in the long-fiber-reinforced resin pellets of example 8 (\approx component (A)) is **0.495 wt%**, whereas claim 1 requires a content of **1.5 to 5 wt%** (feature (A-4)). This constitutes a distinguishing feature between the subject-matter of claim 1 and example 8 of D1a.

- 3.3 Apart from feature (A-2), the appellant did not contest that example 8 complied with the other features of claim 1. On appeal, it questioned that the thermoplastic resin used in the long-fiber-reinforced resin pellets (\approx component (A)) had a relaxation time λ of 0.1 sec or less. The thermoplastic resin used in example 8 is the visbroken propylene homopolymer **PP-E**, which is produced by melt-kneading the commercial propylene homopolymer J-3000G from Idemitsu Petrochemical Corporation in the presence of 0.08 wt% peroxide. As apparent from table 1, PP-E has a melt index (MI) of 200 g/10 min and a molecular weight distribution (Mw/Mn) of 3.9 (table 1). The relaxation time for PP-E is not indicated. According to the appellant, there was insufficient evidence that PP-E had a relaxation time of 0.1 sec or less. In its view, feature (A-2) of claim 1 was therefore a further distinguishing feature over D1a.
- 3.4 For the following reasons, the board does not share the appellant's view in this regard.
- 3.4.1 As can be taken from paragraph [0015] of the patent, the relaxation time λ is a parameter that provides information about the molecular weight of a polymer and Mw/Mn. A low relaxation time, for example, points to a low molecular weight (correlating to a high melt index) and a narrow molecular weight distribution. On the other hand, this correlation also allows to draw conclusions from the MI and Mw/Mn of a polymer about the λ value of the polymer. This was neither contested by the appellant, nor has the board any doubt in this respect.

- 3.4.2 Thus, the decisive question is as to whether or not it can be established with the available data that PP-E inherently fulfilled feature (A-2).
- 3.4.3 In D1a, the starting material J-3000G is treated with 0.08 wt% peroxide. J-3000G has a MI of 30 g/10 min and a Mw/Mn of 5.5 (table 1). The λ -value for J-3000G is not indicated.
- The patent in suit discloses the commercial propylene homopolymer J-3000GV as having a MI of 30 g/10 min and a λ of 0.22 sec (table 1). Furthermore, it can be taken from table 1 of D11, that J-3000GV has a Mw/Mn of 5.5. Thus, it is quite apparent that J-3000G and J-3000GV had the same properties with regard to molecular weight and Mw/Mn. Bearing furthermore the above mentioned correlation between λ and molecular weight properties in mind, this must mean that the starting material J-3000G has the same λ as J-3000GV, namely 0.22 sec. This was not contested by the appellant.
- 3.4.4 However, the appellant questioned that an amount of 0.08 wt% peroxide as used in the production of PP-E would inevitably lead to a relaxation time of 0.1 sec or less (feature (A-2) of claim 1) after melt-kneading (visbreaking).
- 3.4.5 As previously mentioned, the resulting (visbroken) PP-E of example 8 of D1a has a MI of 200 g/10 min and Mw/Mn of 3.9. By reference to D11, the respondent demonstrated that a propylene homopolymer with such a MI and such a Mw/Mn must have a relaxation time in the claimed range.

More precisely, table 1 of D11 shows that a visbroken propylene homopolymer (Y-6005GM) with a similar

molecular weight distribution (Mw/Mn 3.8 *versus* 3.9 for PP-E) but a lower MI (120 g/10 min *versus* 200 g/10 min for PP-E) has a relaxation time of 0.03 sec. For Mw/Mn of 3.9 and the higher MI of 200 g/10 min, the value for λ would even be lower, i.e. far below the upper limit of 0.1 sec. Thus, it is beyond reasonable doubt that PP-E must inevitably have a relaxation time in the claimed range.

3.4.6 This conclusion is also confirmed by the experimental report D12, in which the propylene homopolymer Borealis grade HG265FB (MI = 28 g/10 min; Mw/Mn = 5.60; λ = 0.20 sec) - comparable to the starting polymer J-3000G - was tested. A relaxation time of 0.019 sec after melt-kneading in the presence of 0.05 wt% peroxide was obtained, which is also far below the upper limit required in feature (A-2) of claim 1. This experiment demonstrates that even a peroxide amount of 0.05 wt% (and even lower than the 0.08 wt% used in D1a) leads to a low relaxation time as required by feature (A-2) of claim 1. Thus, the appellant's argument regarding the peroxide content cannot be followed.

3.5 In view of the above, feature (A-2) is implicitly fulfilled by the propylene homopolymer PP-E used in example 8 of D1a.

Therefore, the subject-matter of claim 1 and example 8 of D1a only differ in that the pellet of claim 1 (component (A)) requires that the modified polyolefin-based resin has a content of **1.5 to 5** wt% (feature (A-4)), whereas example 8 of D1a discloses a lower value of **0.495** wt%.

3.6 In the following, it is assessed whether there is an effect resulting from said distinguishing feature.

- 3.6.1 There was disagreement among the parties whether the appellant may rely on technical effects relating to tensile breaking stress and flexural strength (hereinafter also referred to as "the alleged effects") at all. Although those effects were not literally mentioned in the patent, the appellant argued that they are foreshadowed in the patent and therefore could be relied upon when (re)formulating the technical problem. In this context, the appellant pointed out that the experimental data contained in the declarations D8, D10, D13 and D19 demonstrate that the alleged improved effects were indeed obtained.
- 3.6.2 In the respondent's view the alleged effects were neither mentioned in the patent, nor could they be deduced from the patent. The respondent also argued against the admission of documents D10, D13 and D19 into the proceedings.
- 3.6.3 To demonstrate that the alleged effects were foreshadowed in the patent, the appellant first referred to paragraph [0002] of the patent which mentions "high strength" as a common property of long-fiber-reinforced resin compositions. Secondly, it relied on paragraph [0022] of the patent which also mentions "strength" in connection with the amount of the modified polyolefin-based resin in the pellet.
- 3.6.4 The first sentence in paragraph [0002] of the patent reads as follows:

"A molded article formed of a long-fiber-reinforced resin composition is widely used as a module component of an automobile which requires a high strength." (emphasis added)

The appellant is correct that fiber-reinforced resin compositions typically have high strength. However, to fully understand what said paragraph is about, the further sentences in paragraph [0002] need to be considered, which are as follows:

"However, due to insufficient dispersion of reinforcing fibers contained in this long-fiber-reinforced resin composition, the reinforcing fibers may appear in the form of a mass at the surface of a module component. Therefore, module components composed of a long-fiber-reinforced resin composition are required to be used as a component of a part which does not need an excellent external appearance or are required to be used after coating the surface thereof." (emphasis added)

In the board's view, the first sentence in paragraph [0002] only gives a general background information. No hint can be derived therefrom that a specific type of strength property might be envisaged in the patent. Even more importantly, the second and third sentences of paragraph [0002] clarify that the patent is not concerned with an improved strength at all, but it is focused on overcoming the problem of insufficient dispersion and external appearance (in line with the problem mentioned in paragraph [0004] of the patent). Thus, paragraph [0002] does not give any hint that the alleged effects can be deduced therefrom. In this regard, the board shares the respondent's view that this paragraph is evidence that the patent never envisaged the alleged effects.

- 3.6.5 In paragraph [0022] of the patent, "strength" in general is mentioned and not the specific alleged effects.

The term "strength" is a generic term which encompasses numerous strength properties. All possible strength (related) properties cannot be considered as being deducible from the patent simply because they fall within the generic term "strength". Moreover, the term "strength" is mentioned in paragraph [0022] of the patent as a property of the pellet only, but not as a property the whole claimed composition comprising the pellet (A) and the resin (B). Thus, a skilled person could not deduce from paragraph [0022] of the patent that "strength" concerned the whole claimed composition. Thus, paragraph [0022] of the patent also fails to give any hint towards the alleged effects.

3.6.6 Declarations D8, D10, D13 and D19 were filed by the appellant in order to support its case that from paragraph [0022] the skilled person would derive a specific type of strength property as regards the claimed composition. The board decided to admit these documents into the proceedings. Nevertheless, the board finds that, as the patent specification itself does not disclose any information as regards the specific type of strength of the claimed composition itself, these documents cannot be used to complete or elucidate the disclosure of the patent specification so as to support the appellant's position.

3.6.7 In view of the above, the board concludes that the appellant cannot rely on the alleged effects when (re)formulating the technical problem.

Therefore, an effect resulting from the distinguishing feature in view of example 8 of D1a cannot be acknowledged.

3.7 In the absence of any technical effect over the closest prior art, the objective technical problem is considered to be the provision of an alternative long-fiber-reinforced resin composition. There is no doubt that this technical problem is solved.

3.8 D1a discloses a long-fiber-reinforced resin composition comprising a pellet having a modified polyolefin-based resin and a (second, diluting) resin, the only difference being the slightly lower amount of modified polyolefin-based resin in the pellet. However, D1a is by no means limited to any particular amount thereof.

D2a relates to the same technical field of fiber-reinforced polyolefin resin compositions and the examples of D2a concern long-fiber reinforced pellets (see table 3 of D2a) of a similar kind as component (A) of claim 1. Thus, without any doubt, D2a would be taken into consideration by a skilled person when confronted with the objective technical problem of finding an alternative fiber-reinforced resin composition. The examples of D2a relate to polypropylene pellets having a content of 2 wt% of maleic acid modified polypropylene (as the modified polyolefin-based resin), a content which clearly falls within the claimed range of 1.5 to 5 wt%; and example b as shown in Table 3 of D2a even also fulfills all other requirements of component (A) of claim 1. A skilled person trying to find an alternative long-fiber-reinforced resin composition would contemplate a content of a modified polyolefin-based resin of 2 wt% as taught in D2a (e.g. example b of D2a) as an appropriate option, so the claimed subject-matter is an obvious alternative.

Thus, the subject-matter of claim 1 of auxiliary request 1 does not involve an inventive step in view of D1a as the closest prior art in combination with D2a.

AUXILIARY REQUEST 2

4. Claim 1 of auxiliary request 2 only differs from claim 1 of auxiliary request 1 in that the content of the modified polyolefin-based resin is "1 to **3.5 wt%**", instead of "**1.5** to 5 wt%" (auxiliary request 1), so the lower limit of "1" is even closer to the value of 0.495 wt% disclosed in example 8 of D1a. The reasons given for auxiliary request 1 not involving an inventive step are applicable in an analogous manner, so that auxiliary request 2 is not allowable either.

5. Admission of auxiliary requests 3 to 6

Auxiliary requests 3 to 6 were filed more than one year after the statement setting out the grounds of appeal. In claim 1 of each of auxiliary requests 3 to 6, for the first time, component (B) (i.e. the diluting resin) was amended. Furthermore, in all these requests the upper limit of the relaxation time in the feature (B-2) was lowered. In this context, the appellant argued that the claimed subject-matter is even further limited in view of example 8 of D1a; and it was submitted that an advantageous lower value of unopened fibers was achieved, an effect which was mentioned in the patent.

However, such an amendment was neither carried out in any requests filed in the opposition proceedings, nor with the statement setting out the grounds of appeal. So far, the importance of component (B) as part of the claimed composition was never discussed. All previously submitted fall-back positions exclusively concerned a

limitation with respect to the pellet, i.e. component(A). Thus, auxiliary requests 3 to 6 introduce a new complexity to the case and raise new questions regarding the relevance of the amended feature (B-2). In the board's view, a fresh case is created by auxiliary requests 3 to 6 which is also detrimental to the procedural economy.

Thus, the board exercised its discretion under Article 13(1) RPBA not to admit auxiliary requests 3 to 6 into the proceedings.

6. Thus, there remains no allowable request on file.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



D.Magliano

W. Sieber

Decision electronically authenticated