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Datasheet for the decision of 13 December 2024

Case Number: T 2032/22 - 3.3.03

Application Number: 14752639.6

Publication Number: 3083795

IPC: C08K5/36, C08K5/00, C08K5/14, H01B3/44, H01B7/02

Language of the proceedings: EN

Title of invention:
A NEW POLYMER COMPOSITION, POWER CABLE INSULATION AND POWER CABLE

Patent Proprietor:
Borealis AG

Opponent:
The Dow Chemical Company

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
Novelty - main request (no)
Inventive step - auxiliary requests - reasonable expectation of success (yes)

Decisions cited:
T 0594/01, T 0386/17

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Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 2032/22 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 13 December 2024

Appellant: (Patent Proprietor)	Borealis AG Trabrennstrasse 6-8 1020 Vienna (AT)
Representative:	Dehns 10 Old Bailey London EC4M 7NG (GB)
Respondent: (Opponent)	The Dow Chemical Company 2211 H.H. Dow Way Midland MI 48674 (US)
Representative:	Boult Wade Tennant LLP Salisbury Square House 8 Salisbury Square London EC4Y 8AP (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 24 June 2022 revoking European patent No. 3083795 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	M. Barrère
	A. Bacchin

Summary of Facts and Submissions

I. The appeal of the patent proprietor lies against the decision of the opposition division revoking European Patent No. 3 083 795. The contested decision was based on thirteen amended sets of claims filed as main request with letter of 27 November 2020 and as auxiliary requests 1 to 12 with letter of 21 December 2021.

II. Claim 1 of the main request read as follows:

"1. A polymer composition comprising a polyolefin, peroxide and a phenolic sulphur containing antioxidant, wherein said peroxide is present in an amount which corresponds to X mmol –O-O-/kg polymer composition and said phenolic sulphur containing antioxidant is present in an amount which corresponds to Y mmol –OH /kg polymer composition, wherein

$Y_1 \leq Y \leq Y_2$, $X < 35$ and

$0.9 * Y + m \leq X \leq n - k * Y$, wherein

Y_1 is 0.50 and Y_2 is 10, and

m is 0.8, n is 70 and k is 4.7; and

wherein said polymer composition has a melt flow rate (MFR_2) which is 1.7 to 2.3 g/10 min (ISO 1133), and

said polymer composition comprises less than 0.05 % by weight (wt%) 2,4-Diphenyl-4-methyl-1-pentene."

Claim 1 of auxiliary request 1 corresponded to claim 1 of the main request wherein

n was 55 and
the polymer composition comprised less than 0.03 % by weight (wt%) 2,4-diphenyl-4-methyl-1-pentene.

Claim 1 of auxiliary request 2 corresponded to claim 1 of auxiliary request 1 wherein

Y_1 was 2.0,
Y_2 was 8.0 and
m was 3.0.

Claim 1 of auxiliary requests 5 and 7 corresponded to claim 1 of auxiliary requests 1 and 2 respectively, wherein

n was 59 and
k was 5.0.

Claim 1 of auxiliary request 9 corresponded to claim 1 of auxiliary request 2 wherein

m was 16.0 and
n was 57.

Claim 1 of auxiliary request 11 corresponded to claim 1 of the main request wherein the polymer composition comprised

"4,4'-thiobis(2-*tert*butyl-5-methylphenol) antioxidant" and
less than 0.03 % by weight (wt%) 2,4-diphenyl-4-methyl-1-pentene.

Auxiliary requests 3, 4, 6, 8, 10 and 12 corresponded to auxiliary requests 1, 2, 5, 7, 9 and 11 respectively, wherein in claim 1 the polymer composition comprised no 2,4-diphenyl-4-methyl-1-pentene.

III. The following document was *inter alia* cited in the decision of the opposition division:

D2: WO 2011/057928 A1

IV. The contested decision, as far as it is relevant to the present appeal, can be summarised as follows:

- The subject-matter of claim 1 of the main request was novel in view of the disclosure of document D2.

- However, the subject-matter of claim 1 of the main request lacked an inventive step over document D2 as the closest prior art. The same conclusion applied to claim 1 of auxiliary requests 1 to 12.

V. With the statement of grounds of appeal, the patent proprietor (appellant) filed thirteen sets of claims as main request and auxiliary requests 1 to 12. The main request and auxiliary requests 1 to 12 corresponded respectively to the requests dealt with in the decision under appeal.

VI. With letter dated 16 October 2024, the appellant filed two additional amended sets of claims as auxiliary requests 11a and 12a.

Claim 1 of auxiliary request 11a read as follows:

"1. A polymer composition comprising a polyolefin, peroxide and 4,4'-thiobis (2-tertbutyl-5-methylphenol) as the sole phenolic sulphur containing antioxidant, wherein said peroxide is present in an amount which corresponds to X mmol –O-O-/kg polymer composition and said antioxidant is present in an amount which corresponds to Y mmol –OH /kg polymer composition, wherein

$Y_1 \leq Y \leq Y_2$, $X < 35$ and

$0.9 * Y + m \leq X \leq n - k * Y$, wherein

Y_1 is 0.50 and Y_2 is 10, and

m is 0.8, n is 70 and k is 4.7; and

wherein said polymer composition has a melt flow rate (MFR_2) which is 1.7 to 2.3 g/10 min (ISO 1133), and

said polymer composition comprises less than 0.03 % by weight (wt%) 2,4-Diphenyl-4-methyl-1-pentene."

Claim 1 of auxiliary request 12a corresponded to claim 1 of auxiliary request 11a wherein the polymer composition comprised no 2,4-diphenyl-4-methyl-1-pentene.

The remaining claims of these requests are not relevant for the present decision.

VII. Oral proceedings were held before the Board on 13 December 2024.

VIII. The appellant requested that the decision under appeal be set aside and that the patent be maintained in

amended form on the basis of the main request or one of auxiliary requests 1 to 12 all filed with the statement of grounds of appeal or auxiliary requests 11a and 12a filed with letter dated 16 October 2024.

The opponent (respondent) requested that the appeal be dismissed.

IX. The appellant's submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

(a) Main request

The subject-matter of claim 1 of the main request was novel in view of the disclosure of document D2.

(b) Auxiliary requests

The subject-matter of claim 1 of auxiliary requests 1 to 12, 11a and 12a involved an inventive step over document D2 as the closest prior art.

X. The respondent's submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

(a) Main request

The subject-matter of claim 1 of the main request was not novel in view of the disclosure of document D2.

(b) Auxiliary requests

The subject-matter of claim 1 of auxiliary requests 1 to 12, 11a and 12a lacked an inventive step over document D2 as the closest prior art.

Reasons for the Decision

Main request

1. Novelty

1.1 Claim 1 of the main request is directed to a polymer composition characterised *inter alia* in that it comprises less than 0.05 % by weight (wt%) 2,4-diphenyl-4-methyl-1-pentene (DMP).

1.2 The sole point of dispute between the parties was whether example 3 of D2 disclosed a composition with the required amount of DMP ("less than 0.05 wt%").

1.3 In the decision under appeal (point 31 of the Reasons), the opposition division answered that question in the negative. It was found that example 3 of D2 disclosed all the features of claim 1, except for the amount of 2,4-diphenyl-4-methyl-1-pentene (DMP). In particular, the composition of this example contained 0.05 wt% DMP, while claim 1 required "less than 0.05 by weight".

1.4 The difference in DMP content between exactly 0.05% wt% and the upper limit of the "less than 0.05% wt%" range was considered insignificant by the respondent due to the inherent margin of error in measuring such quantities. Citing T 594/01 (points 4.1.5 and 4.1.6 of the Reasons) and T 386/17 (catchword), the respondent asserted that experimental measurements in quantitative

analytical chemistry cannot be separated from their margins of uncertainty. They argued that distinguishing the claimed subject-matter from prior art based on such minor differences in measurement (such as the difference between the range of "less than 0.05 wt%" and a content of 0.05 wt%) was not valid because these small variations fell within the experimental error margin. Therefore, the respondent concluded that claim 1 lacked novelty over example 3 of D2 because the slight difference in the DMP amount was not significant enough to be considered novel (rejoinder to the statement of grounds of appeal, pages 7 and 8, "lack of novelty over D2").

1.5 The appellant stated that the value of "0.05 wt%" in the prior art was not equivalent to "less than 0.05 wt%" as claimed (statement of grounds of appeal, page 7, paragraphs 29 and 30). The EPO had clear rounding rules in order to interpret the scope of ranges within claims. A value of "0.05" would cover a range of "0.0496" to "0.0505" and hence the meaning of the term less than 0.05 is one that was below that range.

The appellant also emphasised that the weight percentage of a component can be measured with high accuracy, without significant experimental error. Even in basic chemistry labs, scales could measure to one-thousandth of a gram, ensuring precise measurement. Given that the examples in D2 involved large polymer samples, it would be easy to accurately measure the DMP content to the level required, reinforcing the point that the 0.05 wt% value in D2 was precise and did not overlap with the range "less than 0.05 wt%".

1.6 As regards the rounding rules, the Board considers that they do not apply in the present case. Rounding is

usually necessary when the value of a specific parameter is not expressed with the same number of decimal places in the claimed invention and in the prior art. In that case, the rounding exercise puts the values on the same level by applying the mathematical rule existing for that purpose (Case Law of the Boards of Appeal, 10th edition 2022, in the following "Case Law", I.C.5.2.2). However, in the present case, the lower limit of the range "less than 0.05% by weight" and the disclosed amount of DMP in example 3 of D2 ("0.05% by weight") are expressed with the same number of digits, so that rounding is not necessary.

1.7 The arguments put forward by the parties also raise the question whether a technical difference can be identified between a disclosed value of exactly 0.05 wt% and the upper limit of the "less than 0.05% wt%" range. In the Board's view, from a mathematical point of view, the difference is infinitesimal. It follows that it is technically not possible to distinguish the two. Indeed, measuring an amount of a component, is always associated with a margin of experimental error. Even if admittedly the margin of error in the present case can be seen as small (and can be even reduced by taking appropriate measures), it will always be more than the infinitesimally small mathematical gap between 0.05 and "less than 0.05".

1.8 Therefore, independently of the margin of error associated to the measurement of DMP amount, it cannot be small enough to exclude that the said margin surrounding the value of 0.05 wt% overlaps with the range of "less than 0.05 wt%". In other words, using the wording of T 594/01 (catchword), the range of "less than 0.05 wt%" is not distinguishable from the reported

value of 0.05 wt% within the margin of experimental error.

1.9 Consequently, in line with decisions T 594/01 (points 4.1.5 and 4.1.6 of the Reasons) and T 386/17 (catchword), the findings of which were not disputed by the parties, the Board concludes that the feature that an amount of DMP is "less than 0.05 wt%" does not establish novelty over example 3 of D2, where the corresponding amount is disclosed to be exactly 0.05% by weight. As it was not disputed that all the other features of the composition of claim 1 are met by example 3 of D2, the subject-matter of claim 1 is not novel over D2.

Auxiliary request 1

2. Inventive step over D2

2.1 Claim 1 of auxiliary request 1 corresponds to claim 1 of the main request wherein

> n is 55 and
> the polymer composition comprises less than 0.03 wt% DMP (the relevant feature for assessing inventive step is highlighted by the Board).

2.2 In the decision under appeal (page 17, point 47 of the Reasons), the opposition division concluded that the subject-matter of claim 1 of auxiliary request 1 did not involve an inventive step in view of document D2 as the closest prior art. In particular, it was found that D2 made it obvious to the person skilled in the art that lower amounts of DMP resulted in advantageously lower conductivities. These findings are disputed by the appellant.

2.3 Closest prior art and distinguishing feature

The parties agreed that:

document D2 could be considered as the closest prior art and

the subject-matter of claim 1 differed from inventive example 3 of D2 in that the amount of DMP was less than 0.03 wt% (instead of 0.05 wt%).

The Board has no reason to depart from that view.

2.4 Objective problem to be solved

The parties did not contest that lowering the DMP content reduced conductivity (statement of grounds of appeal, page 20, paragraph 88; rejoinder to the statement of grounds of appeal, page 9, fourth paragraph).

The Board therefore has no reason to put into question the formulation of the objective technical problem of the appellant, namely the provision of a polymer composition having a lower electrical conductivity after crosslinking (statement of grounds of appeal, page 23, paragraph 94).

2.5 Obviousness

2.5.1 The central point of dispute between the parties was whether, in the light of the teaching of D2, it was obvious to reduce the amount of DMP to less than 0.03 wt% in order to lower the electrical conductivity of

the cross-linked compositions disclosed in that document.

2.5.2 The appellant argued that D2 did not teach the role of DMP (a scorch retarder) in influencing electrical conductivity (statement of grounds of appeal, page 24, paragraph 98 to page 28, paragraph 112; letter of 16 October 2024, page 13, paragraph 55 to page 14, paragraph 62). They emphasised that D2 focused primarily on peroxide content as the key variable affecting conductivity, explicitly stating that lower peroxide levels led to reduced conductivity. This was exemplified in the best example of D2 (example 1), where the lowest conductivity was attributed to low peroxide content rather than to the DMP content.

While the opposition division and the respondent had drawn conclusions about the effect of DMP on conductivity by comparing examples 2 and 3 of D2, the appellant argued that this analysis was flawed. They contended that two data points were insufficient to establish a meaningful technical relationship between DMP content and conductivity. By contrast, the opposed patent contained multiple experiments consistently demonstrating this correlation.

The appellant maintained that the opposition division's analysis stemmed from hindsight bias, as they had only identified the potential relationship between DMP and conductivity after reviewing the opposed patent. According to the appellant, D2 provided no explicit indication that modifying DMP concentration would affect conductivity, and its presence in D2's examples was merely incidental. A skilled person, reading D2 without knowledge of the opposed patent, would have

focused on peroxide content rather than investigating the role of DMP in conductivity reduction.

2.5.3 In agreement with the opposition division, the respondent essentially argued that the skilled person would have derived from the examples of D2 that the conductivity can be reduced by lowering the content of DMP (rejoinder, page 9, last paragraph).

2.5.4 The parties' argument raises essentially the question whether, given the examples of D2 (see Table 1), a person skilled in the art would have concluded that DMP and the amount thereof could have an effect on electrical conductivity.

2.5.5 In that respect, the Board does not contest that the main teaching of D2 is that the conductivity can be lowered by reducing the amount of peroxide (such as dicumyl peroxide DCP) in the compositions (see D2, page 5, lines 10 to 15). This effect is clearly shown in the examples of D2 since the compositions comprising less than 35 mmol DCP /kg polymer (as required by claim 1 of D2) are characterised by a lower conductivity compared to the composition of reference example 2 comprising 42 mmol DCP /kg polymer (results in table 1 on page 37).

2.5.6 However, contrary to the appellant's view, the Board does not hold that the skilled person would not have recognised the potential effect of DMP on conductivity when considering the examples in table 1 of D2.

2.5.7 In this respect, it should be noted that the amounts of peroxide (DCP) and DMP are the only two variables in inventive examples 1 to 3 and reference examples 1 and 2 of D2. Although the effect of DCP (as the main variable) on electrical conductivity is clearly

emphasised in D2 (as noted above), the Board considers that the effect of DMP (as the secondary variable) is not difficult to decipher and therefore cannot be overlooked in the present case.

2.5.8 Specifically, the comparison of inventive examples 2 and 3 is relevant. While the DCP content is slightly increased from 26 to 28 mmol O-O/kg, the DMP content is significantly reduced from 0.18 to 0.05 wt%. According to the main teaching of D2, an increase of the amount of DCP should lead to an increase in electrical conductivity. However, the opposite is observed between inventive examples 2 and 3: despite the slight increase of the peroxide content between examples 2 and 3 of D2, the conductivity decreases. On this basis, the Board holds that the skilled person would inevitably conclude that the decrease in conductivity can only be related to the second difference between examples 2 and 3 of D2: i.e. the reduction of DMP content. On the basis of this comparison, it was an obvious option for a person skilled in the art wishing to further reduce the conductivity of the compositions of D2 to reduce the DMP content.

2.5.9 The Board does not dispute that this conclusion is drawn from only two data points and that it could be questioned whether these data are significant or statistically relevant. However, according to established case law, a course of action can be considered obvious within the meaning of Article 56 EPC if the skilled person would have carried it out in expectation of some improvement or advantage (Case Law, I.D.7.1). In other words, obviousness is not only at hand when the results are clearly predictable but also when there is a reasonable expectation of success. This is the case here. Despite the limited experimental

evidence, the comparison of examples 2 and 3 in D2 establishes a reasonable expectation that the DMP content influences conductivity, thereby guiding the skilled person towards the claimed subject-matter ("obvious to try"). It was therefore obvious for a person skilled in the art wishing to further reduce the electrical conductivity of the compositions of D2, to try a lower amount of DMP and to arrive at a content of less than 0.03 wt%. As to the upper limit chosen for this range, it should be noted that D2 did not contain any specific teaching on the amount of DMP (or scorch retarders in general). The skilled person was therefore free to choose any limit below 0.05 wt% for this range.

2.6 Consequently, the subject-matter of claim 1 of auxiliary request 1 does not involve an inventive step starting from example 3 of D2 as the closest prior art.

Auxiliary requests 2, 5, 7, 9, 11 and 11a

3. Inventive step over D2

Auxiliary requests 2, 5, 7, 9, 11 and 11a have in common that claim 1 is directed to a composition containing less than 0.03% by weight of DMP. It has not been disputed that this feature is the only characteristic which distinguishes their subject-matter from example 3 of D2 (statement of grounds of appeal, page 31, paragraph 129; minutes of the oral proceedings before the Board, page 3, fifth paragraph). It follows that the finding of lack of inventive step for claim 1 of auxiliary request 1 also applies to claim 1 of auxiliary requests 2, 5, 7, 9, 11 and 11a (point 2. of the Reasons).

Auxiliary requests 3, 4, 6, 8, 10, 12 and 12a

4. Inventive step over D2

4.1 Auxiliary requests 3, 4, 6, 8, 10, 12 and 12a have in common that claim 1 is directed to a composition comprising no DMP. It has not been disputed that this feature is the only characteristic which distinguishes their subject-matter from example 3 of D2 (statement of grounds of appeal, page 31, paragraph 129; minutes of the oral proceedings before the Board, page 3, fifth paragraph).

4.2 These auxiliary requests were initially filed by the appellant to at least have a technical effect which is acknowledged (statement of grounds of appeal, page 24, paragraphs 96 and 97; page 31, paragraphs 128 and 129). As noted in the context of auxiliary request 1, the Board already accepted the problem to be solved as put forward by the appellant: i.e. the provision of a polymer composition having a lower electrical conductivity after crosslinking (point 2.4 of the Reasons).

4.3 During the oral proceedings before the Board, the appellant further argued that DMP was present in all inventive examples of D2. The skilled person wishing to lower the electrical conductivity would therefore not remove this seemingly essential component of the compositions.

4.4 Contrary to the appellant's view, the Board finds no basis in D2 for considering that the presence of DMP as a scorch retarder would be essential, even if it is used in all inventive examples. Instead, it can be inferred from this document that the scorch retarder is

an optional additive of the compositions (D2, page 13, lines 9 to 11 and page 18, lines 14 to 17).

4.5 Furthermore, in the context of auxiliary request 1, it was found that is was obvious for a skilled person wishing to reduce the conductivity to lower the amount of DMP to less than 0.03 wt% (point 2.5 of the Reasons). Therefore, if it is obvious to reduce the DMP content to less than 0.03 wt%, it logically follows that it is obvious to reduce it to any lower level, including 0 wt%. For the sake of argument, even if the presence of a scorch retarder were considered necessary (which is not the Board's position), the Board holds that the skilled person would not have had to choose DMP but could have used any other additive with a similar function.

4.6 Consequently, the subject-matter of claim 1 of auxiliary requests 3, 4, 6, 8, 10, 12 and 12a does not involve an inventive step starting from example 3 of D2 as the closest prior art.

5. As none of the appellant's requests is allowable, there is no need for the Board to deal with any other issue and the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Hampe D. Semino

Decision electronically authenticated