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**Datasheet for the decision
of 2 July 2024**

Case Number: T 1020/21 - 3.4.03

Application Number: 14752203.1

Publication Number: 2958151

IPC: H01L31/042, C08K5/14,
C08L23/08, C09K3/10

Language of the proceedings: EN

Title of invention:

RESIN COMPOSITION FOR SOLAR CELL SEALING MATERIALS, SOLAR CELL
SEALING MATERIAL USING SAME, AND SOLAR CELL MODULE

Patent Proprietor:

Japan Polyethylene Corporation

Opponents:

Borealis AG
The Dow Chemical Company

Headword:

Relevant legal provisions:

EPC Art. 123(2)

Keyword:

Added subject-matter - all requests (yes) - undisclosed combination of features consisting of selections from a list of non-converging alternatives and two lists of converging alternatives

Decisions cited:

T 1621/16

Catchword:



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Case Number: T 1020/21 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 2 July 2024

Appellant: Japan Polyethylene Corporation
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 10 May 2021
revoking European patent No. 2958151 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman T. Häusser
Members: M. Papastefanou
 I. Beckedorf

Summary of Facts and Submissions

- I. The appeal of the patent proprietor concerns the decision of the opposition division revoking European patent No. EP 2 958 151 B1.
- II. Two oppositions were filed against the contested patent as a whole invoking all grounds for opposition under Article 100(a) to (c) EPC (lack of novelty and inventive step, lack of sufficient disclosure of the invention and added subject-matter).

In the decision under appeal, the opposition division held that neither the main request nor any of the auxiliary requests 1 to 23 met the requirements of the EPC and revoked the patent under Article 101(3)(b) EPC.

- III. The appellant ("proprietor") requested that the decision under appeal be set aside and that the patent be maintained in amended form according to the main request or one of auxiliary requests 1 to 29.

The main request and auxiliary requests 1 to 22 correspond to the respective requests underlying the impugned decision. Auxiliary request 23 corresponds to auxiliary request 23 underlying the impugned decision with editing corrections in dependent claims 2 to 5. Auxiliary requests 24 to 29 were first filed with the patent proprietor's letter of 5 August 2022.

The respondents ("opponents") requested that the appeal be dismissed.

- IV. Claim 1 of the main request is worded as follows (feature labelling in bold added by the board):

A resin composition for solar cell encapsulant which comprises the following component (A) and component (B):

component (A): an ethylene/ α -olefin copolymer having the following properties (a1) to (a3), wherein the α -olefin of component (A) comprises propylene (**feature O1**),

wherein diene compounds are not added as comonomers to the copolymer:

(a1) a branch number derived from comonomer (N) and a total number of vinyl and vinylidene (V) in the ethylene/ α -olefin copolymer satisfy the following relationship of expression (1) and

the total number of vinyl and vinylidene (V) in the ethylene/ α -olefin copolymer is 0.17 or larger

(**feature Z**):

expression (1): $N \times V \geq 10$

wherein N and V are the number, as determined by NMR, per total of 1,000 carbon atoms contained in the main chain and side chain,

(a2) an MFR (190°C, 21.18-N load) is 5-50 g/10 min (**feature M2**), and

(a3) a density is 0.860-0.920 g/cm³,

component (B): organic peroxide.

Hence claim 1 of the main request comprises a combination of features O1, Z and M2.

V. Auxiliary requests

The complete wording of respective claim 1 of auxiliary requests 1 to 29 is not relevant for the decision. The essential point is that respective claim 1 of all auxiliary requests comprises a combination of some of

the following features (underlining by the board):

feature O1: wherein the α -olefin of component (A) comprises propylene;

feature O2: wherein the α -olefin of component (A) is propylene;

feature O3: wherein the α -olefin of component (A) comprises one or more α -olefins selected from α -olefins having 3-50 carbon atoms, with the proviso that at least one of the α -olefins is propylene;

feature Z: the total number of vinyl and vinylidene (V) in the ethylene/ α -olefin copolymer is 0.17 or larger;

feature M1: an MFR (190°C, 21.18-N load) is 0.1-100 g/10 min;

feature M2: an MFR (190°C, 21.18-N load) is 5-50 g/10 min;

feature M3: an MFR (190°C, 21.18-N load) is 20-40 g/10 min.

Claim 1 of auxiliary requests 1, 2, 11, 12, 13, 14 and 23, comprises a combination of features O1, Z and M2.

Claim 1 of auxiliary requests 3, 4, 5, 6, 15, 16, 17 and 18 comprises a combination of features O2, Z and M1.

Claim 1 of auxiliary requests 7 and 19 comprises a combination of features O2, Z and M2.

Claim of auxiliary requests 8, 9, 20, and 21 comprises a combination of features O1, Z and M3.

Claim 1 of auxiliary requests 10 and 22, comprises a

combination of features O2, Z and M3.

Claim 1 of auxiliary requests 24, 25, 26 and 29 comprises a combination of features O3, Z and M2.

Claim 1 of auxiliary requests 27 and 28 comprises a combination of features O3, Z and M3.

VI. The parties' relevant arguments can be summarised as follows:

The **proprietor** was of the opinion that the claimed combinations of features were based on a selection from a list of non-converging alternatives combined with selections from two lists of converging alternatives. These combinations were converging to a preferred embodiment of the invention and were also supported by the examples in the originally filed application. The skilled person would have understood from the application as a whole that propylene was among the preferred selections for the α -olefin of component (A). There was no added subject-matter in any of the requests.

The **opponents** pointed out that only one of the comonomer examples in the application fell within the claimed scope of any of the requests with respect to features Z and M1/M2/M3 and the comonomer in that example was a combination of propylene and 1-hexene; it could thus not be asserted that this combination corresponded to a comonomer "comprising propylene". There was nothing in the application to indicate that propylene was among the preferred selections for the α -olefin of component (A). None of the claimed feature combinations converged towards a preferred embodiment of the application and the skilled person would not

have derived any of them directly and unambiguously from the originally filed application.

Reasons for the Decision

1. The invention

In photovoltaic installations solar cells are usually encapsulated in some type of plastic casing so that they are protected. The claimed invention relates to a resin composition for such an encapsulant for a solar cell. Due to the harsh operating conditions (installation outdoors, direct exposure to sunlight and the elements), such encapsulants must have good heat and impact resistance. Moreover, since the amount of sunlight incident on the cell is important for the power generation and efficiency of the cell, high transparency of the encapsulant is also desired, so that as much light as possible is transmitted to the solar cell (see paragraph [0004] of the patent).

Such encapsulants usually contain copolymers with high crosslinking capabilities. The invention proposes copolymer compositions comprising propylene with a series of characteristics that provide the desired properties (see e.g. paragraphs [0007] to [0009] of the patent)

2. Relevant issue for the decision

2.1 The only issue under discussion is added subject-matter (Article 123(2) EPC), in particular the question whether the various combinations of the features O1, O2, O3, Z, M1, M2 and M3 included in respective claim 1 of all requests (see points IV. and V. above)

constitute subject-matter extending beyond the content of the originally filed application.

2.2 Since this question relates both to the main request as well as to all auxiliary requests 1 to 29, the following discussion is common for all requests. With the agreement of the parties, the discussion was held accordingly during the oral proceedings.

2.3 It is common ground between the parties that the decisive question in the assessment of compliance with Article 123(2) EPC is whether the various combinations of features defined in the claims meet the so-called "gold standard", i.e. whether the skilled person using its common general knowledge can derive them directly and unambiguously from the content of the application as originally filed.

2.4 For the purposes of the discussion the A1-publication of the application under Article 153(4) EPC is taken to correspond to the "description as originally filed". All text references refer to this document.

3. The individual claimed features

3.1 **Feature 01:** "wherein the α -olefin of component (A) comprises propylene" (emphasis by the board).

Propylene is one of the possible α -olefins for component (A) in the list of paragraph [0047] of the A1-publication. According to paragraph [0046], the ethylene/ α -olefin copolymer *is a random copolymer of ethylene and one or more α -olefins* (underlining by the board). The possibility that the copolymer contains more than one α -olefins as implied by the term "comprises" was thus envisaged in the originally filed

application.

- 3.2 **Feature O2:** "wherein the α -olefin of component (A) is propylene" (emphasis by the board).

The opposition division considered that this feature constituted added subject-matter because it represented a combination of selections from two lists of non-converging alternatives. The definition that there was only one α -olefin constituted a first selection from the list with the alternatives "one α -olefin" and "more than one α -olefins" in paragraph [0046]. The second selection was the selection of propylene from the list of possible α -olefins in paragraph [0047].

The board does not agree. A selection of one of two alternatives can hardly be considered a selection from "a list of alternatives". In the board's view, the skilled person does not have to make any choices when limiting the copolymer to contain only one α -olefin. Paragraph [0046] mentions individually the possibilities that there are more than one α -olefins and also that there is only one ("one or more α -olefins"). The comonomers in the majority of the examples also contains only one α -olefin (see Table 1 on page 14 of the A1-publication).

The board concludes thus that this feature on its own does not constitute added subject-matter.

- 3.3 **Feature O3:** "wherein the α -olefin of component (A) comprises one or more α -olefins selected from α -olefins having 3-50 carbon atoms, with the proviso that at least one of the α -olefins is propylene" (emphasis by the board).

The relevant part of this feature corresponds to the definition of feature 01: the α -olefin of component (A) comprises propylene (and possibly other α -olefins).

- 3.4 **Feature Z:** "the total number of vinyl and vinylidene (V) in the ethylene/ α -olefin copolymer is 0.17 or larger" (emphasis by the board).

According to paragraph [0039] of the A1-publication the value of "0.17 or larger" is a selection from a list of converging alternatives: *The number of vinyl and vinylidene (V) in the ethylene/ α -olefin copolymer is preferably 0.10 (units/total of 1,000 C atoms) or larger, more preferably 0.12 or larger, even more preferably 0.17 or larger, especially preferably 0.2 or larger, so long as expression (1) is satisfied.*

- 3.4.1 The proprietor pointed to the fact that the value of 0.2 had only one decimal digit (i.e. it was not written as "0.20"), while 0.17 had two decimal digits. According to the common conventions regarding rounding of decimal numbers, 0.2 could be understood as a rounded representation of values which included values lower than 0.20, even values lower than 0.17, such as e.g. 0.165. Therefore the range "0.2 or larger" had to be considered broader than "0.17 or larger" and the range selected in feature Z represented thus the narrowest range of that list of converging alternatives, i.e. the most preferred range.
- 3.4.2 The board does not agree. There is no reason why the skilled reader would understand this list of converging alternatives in any other way than the way it is presented, i.e. from the broadest to the narrowest range. There is no suggestion to the skilled reader to consider that "0.2 or larger" could be broader than

"0.17 or larger". The qualifications used for each alternative in the list do not suggest such an interpretation, either: "preferably", "more preferably", "even more preferably", "especially preferably" indicate an increasing degree of preference. In addition, if the order of breadth were to be understood as the proprietor indicated, then there would not be a list of converging alternatives, since the last value would be broader than the penultimate one, i.e. the alternatives would not be converging to the narrowest value.

3.4.3 The board concludes therefore that feature Z constitutes a selection from a list of converging alternatives, but not of the most preferred one.

3.5 **Features M1, M2 and M3**

Paragraph [0043] of the A1-publication states that *[t]he ethylene/ α -olefin copolymer to be used in the invention has an MFR of 0.1-100 g/10 min, preferably 5-50 g/10 min, more preferably 20-40 g/10 min (first sentence).*

Feature M1: "an MFR (190°C, 21.18-N load) is 0.1-100 g/10 min" (underlining by the board) constitutes a selection from a list of converging alternatives, but not the most preferred one.

Feature M2: "an MFR (190°C, 21.18-N load) is 5-50 g/10 min" (underlining by the board) constitutes a selection from a list of converging alternatives, but not the most preferred one.

Feature M3: "an MFR (190°C, 21.18-N load) is 20-40 g/10 min" (underlining by the board) constitutes a selection

from a list of converging alternatives, where 20-40 g/10 min is the most preferred one.

4. Respective claim 1 of the main request and auxiliary requests 1 to 29 comprises a combination of some of the above features (see also points IV. and V. above).

Claim 1 of all requests includes

- the selection of propylene, either alone (feature O2) or as one of the α -olefins (feature O1 or O3)
- the selection of the value range of "0.17 or larger" (feature Z) for the total number of vinyl and vinylidene (V) in the ethylene/ α -olefin copolymer
- a selection of a value range for the MFR (feature M1, M2 or M3).

The relevant feature combination in claim 1 of all requests consists thus of a selection from a list of non-converging alternatives (feature O1/O2/O3) and two selections from lists of converging alternatives (features Z and M1/M2/M3).

5. Decision T 1621/16

- 5.1 The proprietor referred to decision T 1621/16 and argued that selections from lists of converging alternatives constituted limitations of the claimed scope and not selections among different, mutually exclusive alternatives. The claims contained only one selection from one list of non-converging alternatives (propylene) and two selections from lists with converging alternatives. Therefore, there was no issue with added-subject matter.

5.2 Decision T 1621/16 concerned a case where the compliance with Article 123(2) EPC of a similar feature combination was assessed, i.e. a combination of a selection from a list of non-converging alternatives with selections from lists of converging alternatives. According to the deciding board, although selections from lists of converging alternatives should be treated differently from selections from lists of non-converging alternatives, a combination of a selection from a list of non-converging alternatives with selections from lists of converging alternatives was not necessarily compliant with the requirements of Article 123(2) EPC.

The deciding board concluded that there were two criteria which had to be fulfilled in order for such a combination to meet the requirements of Article 123(2) EPC (see Catchword, point 2)):

- (i) the combination of the selected alternatives should not be associated with an undisclosed technical contribution; and
- (ii) the combination of the selected alternatives should be supported by a pointer in the application as filed.

Regarding the pointer in (ii), this could be provided by example(s) or by specific embodiment(s) of the application, as this/these generally represented the most detailed and preferred form(s) of the invention (see point 1.7.3 of the Reasons).

In T 1621/16, the board concluded that claim 1 as amended met the requirements of Article 123(2) EPC because, among others, the selection from the list of non-converging alternatives related to the most preferred one and the selections from the lists of

converging alternatives also related to restrictions to the most preferred alternatives. The selections were also supported by the examples in the application as originally filed (see points 1.8.1 to 1.8.7 of the Reasons).

- 5.3 The board adheres to the reasoning of T 1621/16. The following discussion relates to criterion (ii) presented above.
- 5.3.1 The board notes that in the present case, neither the selection of propylene (features O1/O3 and O2), nor the selection of the value "0.17 or larger" (feature Z), nor the selections of "MFR of 0.1-100 g/10 min" (feature M1) and "MFR of 5-50 g/10 min" (feature M2) relate to the most preferred alternatives of the corresponding lists. Only feature M3 corresponds to the selection of the most preferred alternative of the corresponding list.
- 5.3.2 Therefore, none of the combinations of features in the claims of any of the requests converges to the most preferred form of the invention, since they all comprise at least features O1/O2/O3 and Z.
- 5.4 The proprietor argued that the skilled person reading the application as a whole would have understood that "there [was] something special about propylene", in other words that propylene was one of the preferred alternatives for the α -olefin of component (A).
- 5.4.1 The proprietor pointed to paragraphs [0103] and [0104] of the A1-publication which contained the only detailed descriptions of the polymerization method used to obtain the comonomers of Table 1, and both included propylene. In Table 2, which was the most relevant

disclosure regarding the various examples of copolymers, propylene (C3) was used in 5 examples, the same number of examples as 1-octene (C8) (see examples 1 to 11 in Table 2) which was indicated as the most preferred alternative for the α -olefin of component (A) (paragraph [0047], last sentence). Moreover, Table 1 showed that propylene (C3) produced a high number of branches (N) (see examples PE4, PE6 and PE8) which was important for the crosslinking capabilities of the copolymers. Since high crosslinking capabilities were important for achieving high heat and impact resistances, the skilled person would have understood that propylene was a preferred α -olefin for component (A) of the raisin composition.

5.4.2 In addition, criterion (ii) of T 1621/16 should not be understood so that the combination of selections should converge to the "most preferred example" of the invention but rather to "a preferred form" of the invention. The selections in features Z and M2 also related to preferred embodiments of the invention as indicated in the respective lists: "even more preferably 0.17 or larger" (paragraph [0039]) and "preferably 5-50 g/10 min" (paragraph [0043]). Hence, several of the feature combinations in claim 1 of the main and auxiliary requests converged to a preferred form of the invention.

5.5 The board is not persuaded by the proprietor's arguments.

5.5.1 Regarding the selection of propylene, the first sentence of paragraph [0047] states that *[t]he α -olefins usable as comonomers are α -olefins having 3-50 carbon atoms, and preferably are α -olefins having 8-20 carbon atoms.* As propylene has 3 carbon atoms, it is

already excluded from the preferred α -olefins from the beginning of the paragraph. This is corroborated by the originally filed claims, wherein claim 1 contains no limitation of the α -olefins, dependent claim 6 limits them to those with 8-20 carbon atoms (excluding thus propylene) and dependent claim 7 defines 1-octene as the α -olefin of component (A).

- 5.5.2 As to the description of the polymerization methods (paragraphs [0103] and [0104]), it is noted that both paragraphs describe a polymerization of a combination of propylene (C3) and 1-hexene (C6) (see also examples PE3 and PE5 in Table 1). There is nothing in those paragraphs that would suggest that propylene is more important/special/preferred than 1-hexene.
- 5.5.3 In Table 1 there are only two comonomers (PE3, PE5) comprising propylene with values for V and MFR which fall within the claimed ranges of features Z and M1/M2/M3. Even if propylene alone may have more branches (N) as the proprietor argued, the corresponding examples (PE4, PE6, PE8) do not fall under the claims, so this property is not decisive in the present context.

Furthermore, from Table 1 and the corresponding description the skilled person is not in a position to tell which one of propylene (C3) or 1-hexene (C6) contributes more to achieving the claimed values of the parameters of features Z and M1/M2/M3. Similar considerations also apply to the examples of Table 2. Only Examples 3 and 5 use PE3 and PE5, respectively (see paragraphs [110] and [112]), which are the only comonomers within the claimed scope, as far as features Z and M1/M2/M3 are concerned. In this case as well there is nothing in Table 2 to suggest that propylene

is more important or special than 1-hexene.

- 5.5.4 The board's conclusion is thus that there is nothing in the application as originally filed that would indicate or suggest to the skilled person that "there is something special about propylene". The selection of propylene constitutes therefore an arbitrary selection of a non-preferred alternative from a list of non-converging alternatives.

Hence, a combination of features comprising feature O1/O3 or feature O2 (i.e. the selection of propylene) does not converge towards a preferred form of the claimed invention.

- 5.6 The examples do not provide a pointer to the claimed selection, either, as the second criterion of T 1621/16 requires (see point 5.2 above).
- 5.6.1 As it can be seen in Table 1, only PE3, PE4, PE5, PE6 and PE8, i.e. 5 out of 17 comonomers, concern an α -olefin comprising propylene (C3). As mentioned previously, from those comonomers only PE3 and PE5 have values of the MFR (feature M1/M2/M3) and the total number of vinyl and vinylidene (V) (feature Z) which fall within the claimed ranges. PE3 and PE5 are, however, comonomers consisting of a combination of propylene (C3) and 1-hexene (C6). As mentioned before, the board is of the opinion that there is no indication in the application that propylene plays a more important role in this comonomer than 1-hexene, and therefore the relevant values of PE3 and PE5 relating to features Z and M1/M2/M3 cannot be attributed to propylene alone. It cannot thus be asserted from these sole examples that a combination of propylene with any other α -olefin than 1-hexene would produce a comonomer

having V and MFR values falling within the claimed ranges of features Z and M1/M2/M3.

In the board's view therefore the teaching of these examples cannot be generalised to α -olefins "comprising propylene" (and any other α -olefin) as defined in features O1 and O3. Regarding feature O2 (where the α -olefin "is propylene") PE3 and PE5 do not provide any support at all, since feature O2 does not include any other α -olefin besides propylene.

5.7 The proprietor argued that a "pointer" in the sense of T 1621/16 should not be interpreted as strictly as in the case of a disclosure in the sense of Article 123(2) EPC and a discussion about an intermediate generalisation was not appropriate. The examples showed comonomers with propylene and examples PE3 and PE5 related to a comonomer consisting of propylene and another α -olefin, i.e. an α -olefin "comprising propylene", which was within the claimed scope. This should suffice to provide the pointer to the claimed combination of features required according to the criterion (ii) of T 1621/16.

5.8 The board does not agree. Even if the strict criteria of Article 123(2) EPC are not applied, an example should disclose or suggest the claimed combination of features so that it can be regarded as a pointer to that combination. According to T 1621/16, the examples relate generally to preferred forms of the invention and they can thus provide an indication (pointer) that a specific combination of selections from lists of non-converging alternatives with selections from lists of converging alternatives represents indeed a preferred embodiment of the claimed invention.

PE3 and PE5 (Table 1) are the only examples falling within the claimed scope of features O1/O3, Z, M1/M2/M3, and O1/O3, Z, M1, respectively, but this is achieved by the combination of propylene (C3) and 1-hexene (C6). As stated previously (see point 5.6.1 above), the board is of the view that it cannot be derived from Table 1 or the application as a whole that propylene alone or a combination of propylene with any other α -olefin can achieve values falling within the ranges of features Z and M1/M2/M3.

In the board's opinion therefore, none of the examples in the application as originally filed can be considered a pointer to the claimed feature combinations in the sense of T 1621/16.

- 5.9 The board concludes thus none of the claimed combinations of features O1, O2, O3, Z, M1, M3 and M3 (see points IV. and V. above) is directly and unambiguously derivable from the content of the application as originally filed. Therefore, the subject-matter of respective claim 1 of the main request, as well as of auxiliary requests 1 to 29 extends beyond the application as filed contrary to the requirements of Article 123(2) EPC.
6. In view of this conclusion, the question of admittance into the proceedings of auxiliary requests 24 to 29, which was objected to by the opponents can be left open.
7. Since neither the main request nor any of the auxiliary requests meets the requirements of Article 123(2) EPC, there is no request on the basis of which the patent could be maintained according to Article 101(3)(a) EPC. Hence, the appeal cannot succeed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



B. Atienza Vivancos

T. Häusser

Decision electronically authenticated