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**Datasheet for the decision
of 26 October 2022**

Case Number: T 0165/20 - 3.3.03

Application Number: 14716660.7

Publication Number: 2970643

IPC: C08L23/06, C08L23/08

Language of the proceedings: EN

Title of invention:

POLYMER FILMS HAVING IMPROVED HEAT SEALING PROPERTIES

Patent Proprietor:

Chevron Phillips Chemical Company LP

Opponent:

TotalEnergies OneTech Belgium

Relevant legal provisions:

RPBA 2020 Art. 12(4), 12(6)
EPC Art. 54, 56

Keyword:

Admittance of evidence (no)
Novelty - (yes)
Inventive step - (yes)



Beschwerdekammern

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Case Number: T 0165/20 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 26 October 2022

Appellant: TotalEnergies OneTech Belgium
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
18 November 2019 concerning maintenance of the
European Patent No. 2970643 in amended form.**

Composition of the Board:

Chairman D. Semino
Members: D. Marquis
A. Bacchin

Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division concerning the maintenance of European patent No. 2 970 643 on the basis of the claims of auxiliary request 1 filed with letter of 8 August 2019 and an adapted description.

II. Claim 1 of that request reads as follows:

"1. A polymer composition comprising an ethylene alpha-olefin copolymer, wherein the polymer composition is characterized as having:

(a) a density in the range of from greater than about 0.910 g/cc to about 0.930 g/cc, as determined according to ASTM D1505;

(b) a melt index in the range of from greater than about 0.5 g/10 min to about 2.5 g/10 min, as determined according to ASTM D1238, Condition 190 °C/2.16 kg;

(c) a molecular weight distribution of from about 3.6 to about 12, as determined by gel permeation chromatography;

(d) a weight average molecular weight of from greater than about 85 kg/mol to about 160 kg/mol, as determined by gel permeation chromatography;

(e) a z-average molecular weight of from greater than about 210 kg/mol to about 500 kg/mol, as determined by gel permeation chromatography; and

a CY-a of from about 0.400 to about 0.680, when the dynamic complex viscosity versus frequency scan are fitted to the Carreau-Yasuda equation with an

n = 0.1818 value".

III. The following documents were cited among others in the opposition procedure:

F1: EP2864369 (published as WO 2013/188950 A1 on 27 December 2013)

F2a: Data sheet of Dowlex™ 2045G (May 2001)

F2b: Data sheet of Dowlex™ 2045G (5 March 2012)

F4: US 7119153 B2

F5: US 6 608 000 B1

F6: US 2009/297810 A1

F7: US 2012/0238720 A1

F8: US 2003/171501 A1

IV. As far as it is relevant to the present appeal, the decision of the opposition division can be summarized as follows:

- The claims of auxiliary request 1 were novel over the product Dowlex™ 2045G (F1 in the light of documents F2a/F2b).
- Documents F4 and F6 as well as the product Dowlex™ 2045G were not suitable to be taken as the closest prior art. Claim 1 of the main request differed from examples 3-7 of document F8 in features (c)-(e) and in the parameter CY-a. Starting from document F8 as the closest prior art, the problem solved was to provide a polymer composition comprising an ethylene alpha-olefin copolymer for forming heat sealable films with decreased hot tack initiation temperatures but retaining seal strengths comparable to those of films formed from conventional polyethylene resins. None of the

documents cited pointed towards the combination of features defined in claim 1 of auxiliary request 1. Auxiliary request 1 involved therefore an inventive step.

- V. The opponent (appellant) lodged an appeal against the decision of the opposition division and submitted document F18 with their statement of grounds of appeal:

F18: Qing Yang et al., Alternative View of Long Chain Branch Formation by Metallocene Catalyst, *Macromolecules* 2010, 43, pages 8836-8852 (DOI 10.1021 /ma101469j)

- VI. The patent proprietor (respondent) submitted auxiliary requests 2-20 with the reply to the statement setting out the grounds of appeal maintaining auxiliary request 1 on which the contested decision was based as the main request.

- VII. The parties were summoned to oral proceedings and a communication pursuant to Article 15(1) RPBA 2020 indicating specific issues to be discussed at the oral proceedings was sent to the parties.

- VIII. Oral proceedings were held on 26 October 2022 in the presence of both parties.

- IX. The final requests of the parties were as follows:

- The appellant requested that the decision under appeal be set aside and that the European patent be revoked. The appellant further requested admittance of document F18 into the proceedings and the correction of an obvious error at page 3 of their submissions dated 14 August 2022 in the sense that

the auxiliary requests containing an amendment of parameter "*(c) a molecular weight distribution of from about 3.4*" should "not" be admitted into the proceedings, for violation of the prohibition of *reformatio in peius*.

- The respondent requested that the appeal be dismissed (main request) or that the patent be maintained on the basis of one of auxiliary requests 2 to 20 filed with the reply to the statement setting out the grounds of appeal. The respondent further requested that document F18 not be admitted into the proceedings.

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

- F18 should be admitted into the proceedings.
- Claim 1 of auxiliary request 1 lacked novelty over the commercially available product Dowlex™ 2045G (F1 in the light of documents F2a/F2b).
- Claim 1 of auxiliary request 1 lacked an inventive step starting from F1 in the light of F2a/F2b, F6 or F8 as the closest prior.

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

- F18 should not be admitted into the proceedings.

- Claim 1 of auxiliary request 1 was novel over the commercially available product Dowlex™ 2045G (F1 in the light of documents F2a/F2b).
- Claim 1 of auxiliary request 1 was inventive starting from F1 in the light of F2a/F2b, F6 or F8 as the closest prior art.

Reasons for the Decision

1. Admittance of document F18
 - 1.1 F18 was filed with the statement setting out the grounds of appeal as a document said to address arguments made during the opposition proceedings by the patent proprietor. In particular, the respondent would have contended that the polymers in F6, that were produced in the presence of an unbridged metallocene catalyst, had a CY-a parameter outside the range that was defined in claim 1 of auxiliary request 1 (page 10 of the statement setting out the grounds of appeal). It appears however that this argument had already been made by the patent proprietor at the beginning of the opposition procedure, with their reply to the notice of opposition (sections 4.12 and 4.13). It is thus apparent that F18, which addresses the same argument, could and should have already been filed before the opposition division and not only in appeal proceedings.
 - 1.2 The appellant did not provide a valid justification for the filing of F18 in appeal nor does the Board see a reason as to why that document, which could and should have been considered in the first instance proceedings, was only filed in appeal. On this basis the Board finds it appropriate to exercise its discretion according to

Article 12(4) and (6) RPBA 2020 by not admitting document F18 into the proceedings.

2. Novelty over Dowlex™ 2045G

2.1 The opposition division concluded in their decision (section 10.2) that claim 1 of auxiliary request 1 was novel over the commercially available product Dowlex™ 2045G disclosed in Table 2 of F1 and F2a/F2b because Dowlex™ 2045G was only shown to have a molecular weight distribution (Mw/Mn) of 3.52 which did not fall in the range of from about 3.6 to about 12 defined in claim 1 of auxiliary request 1.

2.2 The argument of the appellant in appeal was that the difference between the value of the molecular weight distribution disclosed for Dowlex™ 2045G in document F1 and the range defined in operative claim 1 was so small that it encompassed normal fluctuations of that parameter when produced industrially. The appellant, however, did not provide evidence in support of that argument.

2.3 Moreover, even accepting that the parameters of the polymer commonly fluctuate in the course of an industrial process, it was not shown that these fluctuations would result in a polymer having a molecular weight distribution within the range of claim 1 of auxiliary request 1 and also one for which the other properties defined as (a), (b), (d), (e) and CY-a would still be according to that claim. In other words, whether a batch of Dowlex™ 2045G having a molecular weight distribution within the claimed range and also properties (a), (b), (d), (e) and CY-a within operative claim 1 was produced and available before the valid date of the patent, is, in the absence of any reliable

evidence, a speculation from the side of the appellant. The Board thus sees no reason to overturn the decision of the opposition division on that point. Claim 1 of the main request is therefore novel over Dowlex™ 2045G as shown in F1 in view of F2a/F2b.

3. Inventive step

3.1 The patent in suit concerns polymer compositions based on ethylene α -olefin copolymers (claim 1, paragraph 7) that can be formed into films (claim 8, paragraph 9) and used as sealants whereby their thermal properties are advantageous for heat sealing applications (paragraphs 5, 6 and 9). The appellant submits that both documents F6 and F8 can be seen as reasonable documents to be taken as the closest prior art. The appellant also considered the commercially available product Dowlex™ 2045G shown in F1 in view of F2a/F2b as an alternative starting point for an inventive step attack against claim 1 of auxiliary request 1.

3.2 Dowlex™ 2045G

3.2.1 Document F1 discloses the use of a batch of Dowlex™ 2045G having a specific set of properties (reference in line 11, page 64 and Table 2, page 67). F1, however, is a patent document according to Article 54(3) EPC since the priority of the patent in suit (11 March 2013) falls between the priorities (21 June 2012 and 14 December 2012) and the publication date (27 December 2013) of F1. In view of that, an embodiment disclosed in F1 as such cannot be the closest prior art.

3.2.2 Documents F2a and F2b are technical datasheets concerning the commercially available product Dowlex™ 2045G that were published in May 2001 (F2a) and 5 March

2012 (F2b), therefore before the priority date of the patent in suit. F2a and F2b report generic properties of Dowlex™ 2045G including its density and melt index but they do not disclose the values of all other properties that are relevant to operative claim 1, namely features (c)-(e) and CY-a and there is no evidence on file from which it could be concluded that the product mentioned in F2a and F2b corresponds to that disclosed in Table 2 of F1. Also, while F2a and F2b indicate that Dowlex™ 2045G was used in industrial and consumer films applications for its toughness and tear resistance, there is no mention in these documents of its use for heat sealing which is the main application of the polymer compositions according to the patent in suit (paragraphs 5, 6 and examples). In view of the absence of parameters regarding Dowlex™ 2045G in F2a and F2b and the fact that its use in these documents is not related to the problem addressed in the patent in suit, the product disclosed therein cannot be seen as a reasonable starting point for the analysis of inventive step and cannot therefore lead to the claimed composition when looking for polymers with heat sealing properties.

3.2.3 The Board therefore finds that the arguments submitted by the appellant taking into account the documents regarding Dowlex™ 2045G do not show a lack of inventive step of claim 1 of auxiliary request 1.

3.3 Document F6

3.3.1 F6 concerns polyethylene films (claim 1, paragraph 14) wherein the polyethylene can contain up to 25 mol percent of α -olefin comonomers and is produced in the presence of a Hafnocene catalyst (paragraph 33). It is apparent from the description that at least some of the

compositions and films generally have thermal (paragraphs 27-31) and mechanical (paragraph 35) properties that make them suitable for heat sealing applications. In view of that, document D6 cannot be seen as an unreasonable starting point for the assessment of inventive step, contrary to the position of the respondent.

3.3.2 The appellant considered in their statement setting out the grounds of appeal that examples 1 and 2 of document F6 are particularly relevant to the question of inventive step (page 9 of the statement setting out the grounds of appeal). These examples (see paragraphs 217 and 218 and Tables) concern compositions of an ethylene/hexene copolymer prepared using a hafnium metallocene catalyst (paragraphs 140 and 141) having densities (example 1: 0.921 g/cc; example 2: 0.9205 g/cc), melt indexes (example 1: 0.7 g/10 min example 2: 0.71 g/10 min), molecular weight distributions (example 1: 4.0; example 2: 3.77), weight average molecular weights (example 1: 127.8 kg/mol; example 2: 129.8 kg/mol), and z average molecular weights (example 1: 339.3 kg/mol; example 2: 361.7 kg/mol) that are according to claim 1 of auxiliary request 1. Document F6 however does not disclose the value of CY-a of these compositions, which constitutes therefore the distinguishing feature.

3.3.3 The CY-a parameter, i.e. Carreau-Yasuda "a" value, is defined, in claim 1 of auxiliary request 1, as being from about 0.400 to about 0.680, when the dynamic complex viscosity versus frequency scan are fitted to the Carreau-Yasuda equation with an $n = 0.1818$ value. All the compositions reported in the patent in suit, apart from that of comparative example 3, have a CY-a in the range defined in operative claim 1. The patent

in suit however does not provide any relevant information about the role of that parameter in the polymer composition nor whether it has an influence on the thermal and mechanical properties of the films produced. In view of that the only problem that can be formulated with respect to document F6 is the provision of further ethylene copolymer compositions suitable for heat sealing applications.

3.3.4 The question of obviousness starting from F6 is whether the skilled person would have been in the position starting from examples 1 and 2 of F6 to prepare ethylene copolymer compositions according to claim 1 of auxiliary request 1, namely fulfilling the CY-a condition, while also maintaining all other properties within the ranges in claim 1, and whether they would have expected these compositions to constitute further ethylene copolymer compositions to those of F6.

3.3.5 Document F4 was cited by the appellant as a document showing that a skilled person would have been able to prepare compositions with a CY-a parameter according to claim 1 of auxiliary request 1. F4 concerns catalyst compositions for polymerizing olefins (column 1, lines 46-49). Among these, F4 discloses the use of dual metallocene catalysts to produce ethylene/olefins copolymers (column 1, line 66 to column 2, line 7). Examples 9 and 11 of F4 (column 50 and following) that were seen as the most relevant by the appellant show the use of such dual metallocene catalysts, in particular Zirconocene based catalysts (Tables 6B and 8B) which are the catalysts of choice in F4 (claim 1). The values of the CY-a parameter of the ethylene/hexene polymers produced are disclosed in Tables 6B and 8B and for samples 9.1-9.8 (CY-a of 0.509 to 0.672), samples 9.11-9.14 (CY-a of 0.569 to 0.652) and samples 11.1 and

11.2 (CY-a of 0.534 and 0.499 respectively) they are within the range of operative claim 1. F4 therefore shows that ethylene/hexene polymers having a CY-a parameter according to claim 1 of auxiliary request 1 can be produced with dual Zirconocene catalysts. It has however not been shown by the appellant that the skilled person would have considered that teaching of F4 to be relevant since the production of ethylene polymers in F6 is based on different catalysts, namely Hafnocene catalysts (paragraphs 33, 34, 140 and examples 1 and 2 in Table 4). In particular, starting from examples 1 and 2 of F6 the use a dual Zirconocene catalyst would run against the general teaching of F6 which is to use Hafnocene catalysts. Also, it has not been shown by the appellant that the use of dual Zirconocene catalysts in F6 would lead to ethylene/hexene polymers that would satisfy the conditions (a)-(e) set out in claim 1 of auxiliary request 1 in addition to the condition regarding the CY-a parameter. The Board concludes therefrom that it has not been shown that claim 1 of auxiliary request 1 lacks an inventive step starting from F6 in view of F4.

3.3.6 Document F5 was also cited by the appellant but that document does not concern the parameter CY-a and as such cannot provide a meaningful teaching that could show that compositions having a CY-a in the range of operative claim 1 could be prepared.

3.3.7 Document F7 was also briefly cited as a combination document to F6 in the statement setting out the grounds of appeal (section 8). The appellant however provided no analysis nor passages in F7 that could be seen as a reasoned argumentation relevant to the question of obviousness.

3.3.8 Claim 1 of auxiliary request 1 therefore involves an inventive step when starting from F6 as the closest prior art.

3.4 Document F8

3.4.1 Document F8 discloses the production and the use of a particular polyolefin composition in the manufacture of the sealing layer of heat sealable multilayer films (paragraphs 1, 14, 24 and claim 1). F8 was considered as the closest prior art in the decision of the opposition division. The appellant and the respondent also considered in appeal that F8 represented a suitable document to be taken as the closest prior art. The Board sees no reason to depart from that view.

3.4.2 The opposition division considered examples 3-7 of document F8 as relevant starting points for the assessment of inventive step of claim 1 of auxiliary request 1. The appellant and the respondent considered that in particular example 3 in F8 was the most relevant starting point. The copolymer produced in example 3 (paragraph 81) is an ethylene/1-butene copolymer from which heat sealable films were made (examples 9, 10 and 11). Table 2 of document F8 discloses the density (915 kg/m^3) and melt flow rate (melt index) (0.82 g/10 min) of the copolymer both of which are within the ranges defined in claim 1 of auxiliary request 1. There is however in document F8 no disclosure of the properties (c)-(e) and CY-a defined in claim 1 of auxiliary request 1 for the composition of example 3 of F8.

3.4.3 The patent in suit does not contain evidence of an effect over the composition of example 3 of F8. The examples of the patent in suit however do show that

blow films made from ethylene/hexene polymer compositions according to claim 1 of auxiliary request 1 have satisfactory heat sealing and mechanical properties (Tables 2 and 3) by the standards set out in paragraph 54 (hot tack initiation temperature of less than about 100°C, hot tack initiation temperature range of greater than about 20°C, seal initiation temperature of from about 85°C to about 105°C) and paragraphs 52/53 (dart drop strength of 500-2000 g/mil, Elmendorf tear strength in machine direction of from about 70 g/mil to about 300 g/mil and in the transverse direction of from about 250 g/mil to about 650 g/mil). In view of this, the problem is to be formulated as the provision of alternative compositions with satisfactory heat sealing and mechanical properties.

3.4.4 Example 3 of F8 chosen as the starting point concerns the preparation of films from an ethylene/1-butene polymer composition obtained in the presence of n-butyl dicyclopentadienyl hafnium dichloride as catalyst (paragraphs 81 and 75). The appellant has not shown that starting from example 3 of F8 and working within the teaching of that document the skilled person would have been able to obtain compositions according to claim 1 of auxiliary request 1 in the expectation that these solved the posed problem.

3.4.5 The copolymers of examples 1 and 2 of F6 were considered by the appellant as providing an incentive to obtain a set of properties that are according to the definitions (a)-(e) of operative claim 1. However the comonomer (hexene) and catalyst (bis(n-propylcyclopentadienyl) hafnium dimethyl) in these examples are different from those used in F8 (1-butene and n-butyl dicyclopentadienyl hafnium dichloride) with the consequence that the properties obtained for the

polymers of examples 1 and 2 of F6 are not directly transferable to the polymerization in example 3 of F8. Moreover, F6 does not provide any teaching as to the CY-a parameter and it is unclear from the documents filed whether the skilled person could have prepared a composition also having a CY-a of from about 0.400 to about 0.680.

- 3.4.6 Document F5 does not concern the parameter CY-a and as such cannot provide a meaningful teaching that could show that compositions having a CY-a in the range of operative claim 1 could be prepared.
- 3.4.7 With regard to the combination of F8 with F4, reference is made to the analysis above under 3.3.5. In the present situation as well the appellant has not shown that the skilled person would have considered that the teaching of F4 was relevant since the production of ethylene polymers in F8 is based on a different catalyst. Also, it has not been shown by the appellant that the use of a dual Zirconocene catalysts in F8 would lead to ethylene/hexene polymers that would also satisfy the conditions (a)-(e) set out in claim 1 of auxiliary request 1 in addition to the condition regarding the CY-a parameter. The Board concludes therefrom that it has not been shown that claim 1 of auxiliary request 1 lacks an inventive step starting from F8 in view of F4.
- 3.4.8 Claim 1 of auxiliary request 1 therefore also involves an inventive step starting from document F8 as the closest prior art.
- 3.5 In view of the conclusion of the Board that auxiliary request 1 is novel and inventive, there is no need to consider the request for correction of an obvious error

at page 3 of the submissions dated 14 August 2022 of the appellant.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated