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Datasheet for the decision of 30 April 2024

Case Number: T 1310/22 - 3.3.03

Application Number: 14771916.5

Publication Number: 3058002

IPC: C08F10/02, F16L9/12, C08L23/06

Language of the proceedings: EN

Title of invention:
POLYETHYLENE OF RAISED TEMPERATURE RESISTANCE

Patent Proprietor:
Basell Polyolefine GmbH

Opponent:
Borealis AG

Relevant legal provisions:
EPC Art. 100(b), 111(1)
EPC R. 43(1)
RPBA 2020 Art. 11, 12(4)

Keyword:
Amendment to the case - reasons for submitting evidence in appeal proceedings (yes)
Grounds for opposition - insufficiency of disclosure (no)
Remittal - special reasons for remittal

Decisions cited:
G 0002/98, T 0029/14, T 1845/14, T 2007/16

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Case Number: T 1310/22 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 30 April 2024

Appellant: (Patent Proprietor)	Basell Polyolefine GmbH Brühler Strasse 60 50389 Wesseling (DE)
Representative:	LyondellBasell c/o Basell Poliolefine Italia Intellectual Property P.le Donegani 12 44122 Ferrara (IT)
Respondent: (Opponent)	Borealis AG Wagramer Strasse 17-19 1220 Vienna (AT)
Representative:	Kador & Partner Part mbB Corneliusstraße 15 80469 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 1 April 2022 revoking European patent No. 3058002 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	F. Rousseau
	L. Basterreix

Summary of Facts and Submissions

I. The appeal by the patent proprietor lies from the decision of the opposition division revoking European patent No. 3 058 002. The decision was based on the patent as granted as the main request and on nine auxiliary requests.

II. Claim 1 of the granted patent read as follows:

"1. Polyethylene composition having the following features:

1) density from 0.935 to 0.945 g/cm3, preferably from 0.936 to 0.943 g/cm3, determined according to ISO 1183 at 23°C;
2) melt flow index MIF at 190°C with a load of 21.60 kg, determined according to ISO 113, from 10 to 18 g/10 min, preferably from 12 to 18 g/10 min;
3) melt flow index MIP at 190°C with a load of 5 kg, determined according to ISO 113, from 1 to 2.5 g/10 min;
4) ratio MIF/MIP from 5 to 10, in particular from 6 to 9;
5) a ratio Mw/Mn, where Mw is the weight average molar mass and Mn is the number average molar mass, both measured by GPC (Gel Permeation Chromatography) from 5 to 8."

III. The decision was taken having regard to the following document:

D5: WO 2005/103095 A1.

IV. According to the reasons for the contested decision which are pertinent in the appeal proceedings:

(a) The objections under Article 100(c) EPC did not prejudice the maintenance of the patent as granted.

(b) As regard sufficiency of disclosure, the contested patent contained a single example describing the preparation of a polyethylene composition falling within the scope of granted claim 1. That example concerned the combined use of a specific zirconium-complex catalyst and a specific iron (II) dichloride catalyst. The contested patent, however, did not provide any guidance how the two different single-site catalysts and the reaction conditions taught in the patent in suit had to be selected in order to achieve the Mw/Mn and/or MIF/MIP ratio defined in claim 1.

Examples 2 and 3 of D5 that followed the teaching of the patent in suit in particular with respect to the choice of the catalysts and the process conditions were insufficient to obtain a polyethylene composition exhibiting the desired Mw/Mn and/or MIF/MIP ratios. Example 1 of D5 showed that slight differences in the process conditions could have a major impact on the resulting Mw/Mn ratio.

Accordingly, these examples of D5 demonstrated that the skilled person was faced with an undue burden of experimental work in order to carry out the invention over the whole breadth of granted claim 1.

On that basis, the objections under Article 100(b) EPC prejudiced the maintenance of the patent as granted.

(c) The same reasons concerning lack of sufficiency likewise applied to the nine auxiliary requests.

(d) The contested patent was therefore revoked.

V. An appeal was filed by the patent proprietor (appellant).

VI. With their statement of grounds of appeal, the appellant filed the following additional document:

D8: C. Bianchini *et al.*, "Ethylene oligomerization, homopolymerization and copolymerization by iron and cobalt catalysts with 2,6-(bis-organylimino)pyridyl ligands", Coordination Chemistry Reviews 250 (2006) 1391–1418.

With the same letter, an auxiliary request was submitted whose wording is not relevant to this decision.

VII. A reply to the statement of grounds of appeal was submitted by the opponent (respondent).

VIII. In preparation of the oral proceedings, a communication pursuant to Article 15(1) RPBA conveying the Board's provisional opinion was issued.

IX. Oral proceedings before the Board were held on 30 April 2024 by videoconference with the participation of both parties.

X. The final requests of the parties were as follows:

- The appellant requested that the decision of the opposition division be set aside and the case be remitted to the opposition division for consideration of the remaining grounds of opposition, either on the basis of the main request (patent as granted), or alternatively on the basis of the claims of auxiliary request 1 submitted with the statement of grounds of appeal.

- The respondent requested that the appeal be dismissed.

XI. The parties' submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. The contentious points essentially concerned the admittance of document D8 and the question whether claim 1 of the granted patent met the requirement of sufficiency of disclosure, taking into account examples 1 to 3 of D5.

Reasons for the Decision

Admissibility of D8

1. The submission of document D8 is to be regarded as an amendment to the appellant's appeal case within the meaning of Article 12(4) RPBA, whose admittance is at the discretion of the Board. Pursuant to Article 12(4) RPBA, the Board shall exercise its discretion in view of, inter alia, the complexity of the amendment, the suitability of the amendment to address the issues

which led to the decision under appeal, and the need for procedural economy.

1.1 While it was acknowledged that one way of performing the invention had been disclosed with the example of the patent in suit, it was considered by the opposition division that this single example did not allow the skilled person to perform the invention in the whole range claimed, since the contested patent did not provide any guidance how the catalyst components and the reaction conditions had to be selected in order to achieve a desired Mw/Mn and/or MIF/MIP ratio, even taking into account the general teaching of the patent in suit.

In this respect, the respondent submitted for the first time during the oral proceedings before the opposition division that two combinations of single-site catalysts which could be envisaged in accordance with the teaching of the patent in suit would not lead to the Mw/Mn required by operative claim 1, as would be shown by examples 2 and 3 of D5. This line of argument based on example 2 and 3 of D5 is at the core of the opposition division's reasoning as to why the teaching of the patent in suit was insufficient.

1.2 D8 was submitted by the appellant to illustrate the common general knowledge regarding methods for controlling the molecular weight distribution, i.e. the Mw/Mn ratio, of polyolefins in a single-step polymerization using a catalyst system containing two or more different single-site catalysts, also known as multi-component tandem polymerization. It can be made reference to the passage of D8, page 1414, section 11, last full paragraph, cited by the appellant in their statement of grounds of appeal.

The respondent submitted that D8 does not concern the combinations of catalysts used in examples 1 to 3 of D5 and for this reason did not address the issue of sufficiency of disclosure addressed at the oral proceedings. D8 was seen by the respondent as merely addressing tandem polymerization, which was well known in the art. Its submission was therefore superfluous.

1.3 The patent in suit also concerns polyolefins prepared by multi-component tandem polymerization, i.e. using a catalyst system containing a mixture of single-site catalysts. Even if D8 does not concern a polymerization method using the combinations of catalysts of examples 1 to 3 of D5, it is immediate that this document is relevant at least to the extent that it provides information about the ability to control the molecular weight distribution by using a mixture of single-site catalysts. Moreover, D8 also concerns 2,6-bis(organylimino)pyridyl Fe(II) catalysts, i.e. catalysts of the type used in the patent in suit. The fact that some relevant information might be well known in the art has no bearing on the admittance of D8. What counts is rather whether said information can be seen as a genuine attempt to counter the new submissions of the respondent during the oral proceedings before the opposition division, which the Board answers in the affirmative.

1.4 Moreover, the submission of D8 at the outset of the oral proceedings constitutes a timely attempt to answer the respondent's new submissions at the oral proceedings before the opposition division.

1.5 The Board therefore decided to exercise its discretion under Article 12(4) RPBA in admitting D8 into the proceedings.

Sufficiency of disclosure - main request (granted patent)

2. According to the established jurisprudence of the Boards of Appeal of the EPO a European patent complies with the requirements of sufficiency of disclosure, if a skilled person, on the basis of the information provided in the patent specification and, if necessary, using common general knowledge, is able to carry out the invention as claimed without undue burden, i.e. with reasonable effort, over its full scope.

2.1 In this respect, the term "invention" corresponds, in accordance with Rule 43(1) EPC, to the specific combination of features in the claim, as was reminded in Opinion G 2/98 of the Enlarged Board of Appeal (Reasons, point 2), whose definition is used when issues of priority ("in respect of the same invention" (Article 87(4) EPC)), novelty ("An invention shall be considered to be new if" (Article 54(1) EPC)) and inventive step ("An invention shall be considered as involving an inventive step if" (Article 56 EPC)) are considered. There is no reason to consider a different meaning of the term "invention" in relation to the issue of sufficiency of disclosure (see decision T 1845/14, Reasons, point 9.6).

2.2 In the present case, the invention whose sufficiency of disclosure is objected to by the respondent is the polyethylene composition as defined by the terms of granted claim 1. That polyethylene is defined by its density, its MIF and MIP, its ratio MIF/MIP and its ratio Mw/Mn. The appellant's argument that Mw/Mn and

MIF/MIP relate to the molecular weight distribution, the higher their values, the broader the molecular weight distribution (statement of grounds of appeal, page 4, lines 10-11), is common general knowledge and undisputed.

The question to be answered is whether the skilled person can prepare such polyethylene composition over its full scope, which scope is set out in particular by the parametric values set out in granted clam 1.

Moreover, according to established case law (Case Law of the Boards of Appeal of the EPO, 10th edition 2022, in the following "Case Law", II.C.7.1.2), an invention is in principle sufficiently disclosed if at least one way is clearly indicated enabling the person skilled in the art to perform the invention in the whole range that is claimed. Whether the disclosure of one way of performing the invention is sufficient to enable a person skilled in the art to carry out the invention in the whole claimed range is a question of fact that must be answered on the basis of the available evidence, and on the balance of probabilities in each individual case.

2.3 According to the appellant it is state of the art that *in-situ* blending of polyethylene components can be obtained as an alternative to a multistep, sequential polymerization, by a single-step polymerization, using a catalyst system containing two or more different active sites, each one providing a polymer fraction with different molecular weights and/or molecular weight distributions (statement of grounds of appeal, page 4, lines 16-20).

Evidence that such an *in-situ* blending technique was well known in the art at the date of filing can be found in section 11 of D8 in which it is indicated in the first paragraph of said section that reactor blending, i.e. a method for controlling the molecular weight (MW) and the molecular weight distribution (MWD) of polyolefins involving the combination of two or more types of catalysts in a single reactor to produce polymers with different MW and MWD has achieved considerable industrial attention, as it is capable of producing easily polymers with good properties by using just a single polymerization process. This is not disputed by the respondent.

This is also reflected in the background section of D5 (page 2, lines 9-13) in which it is stated that "*The use of catalyst compositions comprising two or more different olefin polymerization catalysts of the Ziegler type or the metallocene type is known. For example, it is possible to use a combination of two catalysts of which one produces a polyethylene having a mean molar mass which is different from that produced by the other for preparing reactor blends having broad molecular weight distribution*".

2.4 *In-situ* blending is also the method taught in the patent in suit in order to prepare the claimed polyethylene composition (paragraphs [0016] and [0018] to [0025]). According to paragraph [0018] the present invention employs a catalyst composition comprising at least two different single-site polymerization catalysts A) and B), for which examples are given in paragraphs [0021] and [0024], respectively. Such a method is illustrated with the sole working example of the patent under dispute.

In this respect, it is common general knowledge that single site catalysts deliver a narrow monomodal MWD. It is also common general knowledge that different catalysts employed under the same polymerization conditions are expected to lead to different products in terms of molecular mass. This is also not disputed.

Accordingly, it is the skilled person's expectation that using a combination of two single-site catalysts A) and B) under the same polymerization conditions leads to a broader molecular weight in comparison to the use of one or the other identical single-site catalyst.

For the same reason, variations of the molar ratio of such single-site catalysts A) and B), which influences the proportion of polyethylene resins produced by catalysts A) and B), are expected by the skilled person to result in variations of the molecular weight distribution, and therefore in variations of the Mw/Mn and the MIF/MIP ratio.

Finally, it is undisputed that the use of hydrogen as molar mass regulator belongs to common general knowledge.

2.5 Furthermore, since, as pointed out by the respondent (rejoinder, paragraph bridging pages 4 and 5), it is well known in the art that the Mw/Mn ratio and the MIF/MIP ratio strongly depend on the nature of the catalyst, i.e. on the selection of the specific catalyst components used for tandem polymerization, there is a *prima facie* argument that the skilled person would start from the teaching of the example in the patent in order to carry out the invention as defined in claim 1 over its full scope.

In this respect, it has not been contested that the single working example of the opposed patent would yield a polyethylene having an Mw/Mn ratio as claimed (rejoinder, section 7.9, second paragraph, first sentence).

Consequently, the skilled person starting from the example of the specification, i.e. using the specific combination of catalyst components A) and B) described therein, including their relative amount, and the polymerization conditions described for this example, would be able to vary the melt flow indices and the molecular weight distribution within the limits defined in operative claim 1 by varying in an obvious way the hydrogen feed as molar mass regulator and the molar ratio of the specific catalyst components, as taught in paragraphs [0033] and [0038] of the specification, respectively.

2.6 The respondent submits in addition that the working example exclusively concerns the preparation of an ethylene-1-hexene-copolymer, while granted claim 1 would encompass both homopolymers and a huge variety of different copolymers of ethylene (rejoinder, point 6.3).

The copolymers in accordance with the patent in suit are those with 1-alkenes, such as 1-hexene used in the example. In this respect, no evidence was provided by the respondent that the combination of the catalyst components employed for the working example would lead to substantial difference in reactivity between ethylene and 1-alkenes. On that basis, that argument constitutes a mere allegation devoid of any concrete support and is for this reason not persuasive.

According to settled case law, an objection of insufficient disclosure presupposes that there are serious doubts, substantiated by verifiable facts, and the burden of proof is primarily on the opponent, here the respondent (Case Law, *supra*, II.C.9). The respondent, however, failed to demonstrate that such serious doubts existed in relation to the combination of catalysts used in the example of the patent in suit in order to prepare the polyethylene composition of operative claim 1 over its full scope.

2.7 Accordingly, in the Board's judgment the specification discloses one way which enables the person skilled with the common general knowledge in mind to perform with a reasonable amount of experimentation the invention in the whole range that is claimed, namely by using the combination of specific catalysts taught in the example of the patent in suit and varying if necessary their relative amounts and the polymerization conditions, including the amount of hydrogen as mass regulator.

3. The respondent's objection is in essence based on the argument that the specification does not comprise an adequate teaching allowing the skilled person to generally prepare the claimed polyethylene resins with combinations of catalysts in accordance with the general teaching of the patent in suit, i.e. in their opinion combinations of catalysts different from that used for the sole example of the patent in suit (rejoinder, sections 6.6 and 7.9).

In agreement with the contested decision, it is submitted by the respondent that combinations of catalyst components A) and B) and experimental conditions which are also within the general teaching

of the specification do not necessarily result in a polyethylene composition meeting the Mw/Mn requirements set out in operative claim 1.

This would be demonstrated by examples 2 and 3 of D5 which would be perfectly in line with the teaching of the opposed patent (rejoinder, section 6.8). Example 1 of D5 would demonstrate that the sole change of catalyst component B) results in a significant decrease of the Mw/Mn ratio.

In the respondent's opinion, the skilled person would have to conduct a research program to identify suitable catalyst systems and polymerization conditions for obtaining a polyethylene composition having a Mw/Mn ratio and/or MIF/MIP ratio according to the claim, which clearly exceeds routine experimentation and, thus, amounts to an undue burden contravening the requirement for sufficiency of disclosure.

3.1 The respondent's argumentation which is based on the use of a particular combination of catalysts used in examples 1 to 3 of D5 to obtain a polyethylene composition in accordance with the parametric definition of granted claim 1 is not persuasive, as it concerns an invention which is neither that defined by the terms of operative claim 1, nor in accordance with the teaching of the patent in suit.

As pointed out in points 2.1 and 2.2 above, the invention as defined by the terms of operative claim 1 concerns a polyethylene composition which meets certain parametric values. It is not directed to a process for producing a polyethylene composition meeting the parametric requirements of claim 1 using the

combination of catalysts employed in examples 1 to 3 of D5.

Whereas the present specification teaches in a general manner that catalyst A) can be selected from the list of metallocene catalysts indicated in paragraph [0021] and preferred examples of complexes B) are those listed in paragraph [0024], it does not teach that any of the catalysts recited in paragraph [0021] can be used in combination with any of the complexes recited in paragraph [0024], let alone a combination of catalysts as used for examples 1 to 3 of D5.

3.2 The respondent's argumentation rather concerns the question whether the present specification discloses or suggests an additional way of performing the claimed invention by using a different combination of catalysts. Whether this could be only arrived at while exercising an inventive activity, e.g. using an undue amount of experimentation, would be only relevant to question whether such process would constitute an inventive selection out of the disclosure provided in the patent in suit. This, however, does not concern the invention as defined by the terms of operative claim 1.

3.3 Decision T 2007/16 relied upon by the respondent during the oral proceedings is not relevant to the present case. It concerns a situation in which a dependent claim was directed at subject-matter that the skilled person would not know how to obtain. On that basis, it was held that the invention defined in the corresponding independent claim was not sufficiently disclosed over the whole scope encompassed by the claim. This decision, however, does not concern the situation underlying the present case in which the subject-matter alleged to be insufficiently disclosed,

i.e. the preparation of the polyethylene composition of granted claim 1 using a specific combination of catalysts, is not claimed.

Decision T 29/14 which was also argued by the respondent during the oral proceedings to further support their position concerns a different factual situation. As shown in points 1.2 and 1.4.3 of the Reasons, it does not concern a case in which based on an example and variations thereof taught by the specification and/or suggested by the common general knowledge, the skilled person would know how to perform the invention over the full scope of the claim. It is therefore not pertinent to the present case.

4. In view of these considerations, it is concluded that the objection based on Article 100 (b) EPC does not prejudice maintenance of the patent as granted.

Remittal

5. The remaining grounds for opposition of lack of novelty and inventive step were not decided upon by the opposition division, let alone debated at the oral proceedings. It was undisputed that under the present circumstances the case should be remitted for further prosecution. This is seen by the Board to constitute "special reasons" within the meaning of Article 11 RPBA to remit the case for further prosecution to the department whose decision was appealed.

Accordingly, exercising its discretion under Article 111(1), second sentence, EPC, the Board decides to remit the case to the opposition division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division for further prosecution.

The Registrar: The Chairman:

A. Pinna D. Semino

Decision electronically authenticated