Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 17 February 2021

Case Number: T 1798/17 - 3.3.03

Application Number: 06755094.7

Publication Number: 1879931

IPC: C08F210/06

Language of the proceedings: EN

Title of invention:
PROPYLENE-ETHYLENE COPOLYMERS AND PROCESS FOR THEIR PREPARATION

Patent Proprietor:
Basell Poliolefine Italia S.r.l.

Opponent:
W.R. Grace & Co.-Conn.

Relevant legal provisions:
RPBA Art. 12(4), 12(2)
EPC Art. 100(b), 111(1)
RPBA 2020 Art. 11

Keyword:
Main request - no reason to disregard
Main request - Sufficiency of disclosure (yes)
Remittal - special reasons for remittal

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1798/17 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 17 February 2021

Appellant: (Patent Proprietor)	Basell Poliolefine Italia S.r.l. Via Pontaccio 10 20121 Milano (IT)
Representative:	LyondellBasell c/o Basell Poliolefine Italia Intellectual Property P.le Donegani 12 44122 Ferrara (IT)
Respondent: (Opponent 1)	W.R. Grace & Co.-Conn. 7500 Grace Drive Columbia, MD 21044-4098 (US)
Representative:	V.O. P.O. Box 87930 2508 DH Den Haag (NL)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 19 June 2017 revoking European patent No. 1879931 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	F. Rousseau
	A. Bacchin

Summary of Facts and Submissions

I. The present appeal lies from the decision of the opposition division posted on 19 June 2017 revoking European patent No. 1 879 931 on the ground that it did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

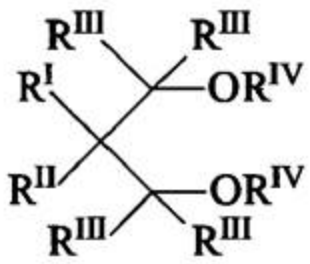
II. The decision of the opposition division was based on two sets of claims labelled "Third Auxiliary Request" and "Fourth Auxiliary Request", both requests submitted with letter of 26 May 2017, the other claim requests having been withdrawn at the beginning of the oral proceedings on 31 May 2017. Claims 1, 9 and 10 of the main request, labelled "Third Auxiliary Request" read as follows (features added compared to the claims as granted are highlighted by the Board in underline):

"1. Propylene/ethylene copolymers characterized by the following properties:

- Ethylene content measured by IR spectroscopy in the range of 4.5-7%wt;
- Mw/Mn (via GPC) in the range 3.5-5.5;
- Mz/Mw (via GPC) lower than 4;
- absence of 2-1 regioinversion, and
- Melting Temperature (Tm) (non-nucleated grade) lower than 143°C and
- Melt Flow rate according to ISO 1133 (230°C, 2.16 Kg) ranging from 0.1 to 2 g/10'.

9. Process for the preparation of the propylene/ ethylene copolymers of claim 1 carried out in a slurry

of liquid propylene as a polymerization medium and in the presence of a catalyst system comprising a solid catalyst component comprising at least one titanium compound having at least one titanium-halogen bond and at least an electron-donor compound (internal donor), both supported on magnesium chloride compound said electron donor compound being selected from 1,3-diethers and in particular from those of formula (I)



(I)

where R^I and R^{II} are the same or different and are hydrogen or linear or branched C_1-C_{18} hydrocarbon groups which can also form one or more cyclic structures; R^{III} groups, equal or different from each other, are hydrogen or C_1-C_{18} hydrocarbon groups; R^{IV} groups equal or different from each other, have the same meaning of R^{III} except that they cannot be hydrogen; each of R^I to R^{IV} groups can contain heteroatoms selected from halogens, N, O, S and Si.

10. Process according to claim 9 in which the slurry density is lower than 550kg/m^3."

III. Two oppositions had been filed requesting revocation of the patent in its entirety on the grounds that its subject-matter lacked novelty and an inventive step (Article 100(a) EPC), and that the invention was not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC).

IV. The following documents were cited *inter alia* before the opposition division:

D18: WO 97/31954 A1 / US 6,693,161 B2
D27: EP 0 728 769 A1
D28: "Propene/Ethene-[1-^{13}C] Copolymerization as a Tool for Investigating Catalyst Regioselectivity. $MgCl_2$/ Internal Donor/$TiCl_4$-External Donor/AlR_3 Systems", Macromolecules, V. Busico et al., 2004, *37*, pages 7437 to 7443.

V. An appeal identified as T 0089/13 lay from a first decision of the opposition division concerning the present patent in the form as granted in which it was decided that its subject-matter was insufficiently disclosed. The Board decided that the alleged uncertainty in respect of the absence of 2-1 regioinversion and the ethylene content in the propylene/ethylene copolymer, owing to the absence of any specific indication in granted claim 1 of the patent in suit of methods for determining those parameters, did not alone result in a lack of sufficiency of disclosure of the claimed subject-matter. According to the Board this objection merely amounted to a lack of clarity which did not arise out of any amendment and therefore could not be objected to in opposition proceedings. Moreover, the Board noted that neither this first decision of the opposition division nor the written arguments in the first appeal addressed the question as to whether the skilled person would be able to perform the invention as defined by the terms of the claims. The impugned decision did not address in particular whether the skilled person would be able to prepare propylene/ethylene copolymers meeting the combination of parameters defined by the terms of claims 1 to 8, claims 2 to 8 defining

preferred embodiments of product claim 1, or to carry out the process for their preparation as defined by the terms of claims 9 and 10, throughout the whole area(s) claimed, taking into account the information given in the patent in suit, using common general knowledge and routine experimentation. The contested decision in particular did not take into account the arguments relating to sufficiency of disclosure submitted by opponent 2 in relation to D18. Since the essential issues to be addressed in respect of sufficiency of disclosure, as well as the issues of novelty and inventive step had not been dealt with in the contested decision, the Board remitted the case to the opposition division for further prosecution.

VI. The opposition of opponent 2 was withdrawn by letter of 18 May 2017 during the further prosecution of the opposition proceedings.

VII. According to the second decision of the opposition division which is the subject of the present appeal, the opposition division, while acknowledging that Examples 1 to 4 of the patent in suit using specific catalytic systems provided sufficient information to prepare copolymers meeting the specific combination of parameters defined in granted claim 1, held that neither the teaching of the patent in suit, nor the common general knowledge enabled the skilled person to prepare without undue experimental burden the claimed copolymers over the full scope of claim 1, in particular in respect of copolymers meeting the "*threshold values of the claimed ranges*". It was held that the patent in suit did not contain a reliable disclosure of the necessary measures for arriving over the full scope of claim 1 at copolymers having a combination of the parametric values defined in claim 1

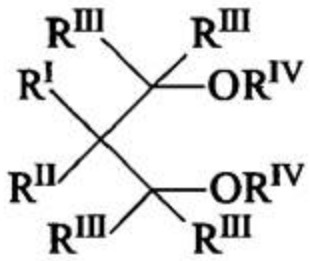
in addition to the required "absence" of 2-1 regioinversion. Especially, information concerning the fine tuning of the process conditions for achieving the claimed combination of at least partly interrelated parameters was insufficiently disclosed. While acknowledging that the skilled person was aware that the melting temperature and the melt flow rate defined in claim 1 could be obtained by merely varying the content of comonomer and the hydrogen feed, respectively, the opposition division considered that the skilled person starting from these specific examples and further knowing the details of e.g. D18 and D28 would need inventive skills or an undue amount of experimental work to obtain the copolymers over the full scope of claim 1. This would require to find not only a suitable catalyst system including the necessary internal and external electron donors in the required amounts, in particular the weight ratio of organo-aluminium compound to external electron donor, but also a specific set of reaction conditions yielding copolymers exhibiting the required parametric values, as well as the key characteristic of the "absence" of 2-1 regioinversion. It was therefore concluded that the invention in accordance with the main request labelled "Third Auxiliary Request" was not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. As to the "Fourth Auxiliary Request", comprising only process claims for the preparation of propylene/ethylene copolymers which were defined by the same combination of parameters to the exception of the melt flow rate, it did not meet the requirements of Article 123(2) EPC and also those of sufficiency of disclosure despite the fact that it required the use of a specific class of silicon compounds as external electron donors.

VIII. The patent proprietor (appellant) lodged an appeal against said decision, the statement of grounds for appeal being submitted with letter of 30 October 2017. Two sets of claims were enclosed with the statement setting out the grounds of appeal as main request and auxiliary request, as well as the following document:

D40: Propylene handbook, edited by Nello Pasquini, 2nd Edition, Carl Hanser Verlag, Munich, 2005, pages 18 and 113.

IX. The main request consisted of 8 claims. Independent claim 1 thereof had the same wording as claim 1 of the "Third Auxiliary Request" underlying the contested decision which is provided in above section II. The other independent claim of the main request was claim 7 whose wording in comparison to the text of claim 9 as granted (additions highlighted by the Board in underline, and deletions in strike through) read as follows:

"~~9~~7. Process for the preparation of the propylene/ ethylene copolymers of claim 1 carried out in a slurry of liquid propylene as a polymerization medium and in the presence of a catalyst system comprising (a) a solid catalyst component comprising at least one titanium compound having at least one titanium-halogen bond and at least an electron-donor compound (internal donor), both supported on magnesium chloride compound said electron donor compound being selected from 1,3-diethers and in particular from those of formula (I)



(I)

where R^I and R^{II} are the same or different and are hydrogen or linear or branched C_1-C_{18} hydrocarbon groups which can also form one or more cyclic structures; R^{III} groups, equal or different from each other, are hydrogen or C_1-C_{18} hydrocarbon groups; R^{IV} groups equal or different from each other, have the same meaning of R^{III} except that they cannot be hydrogen; each of R^I to R^{IV} groups can contain heteroatoms selected from halogens, N, O, S and Si, (b) an organo-aluminum compound and (c) an external electron donor compound selected from silicon compounds, of formula $R_a^5R_b^6Si(OR^7)_c$, where a and b are integer from 0 to 2, c is an integer from 1 to 3 and the sum (a+b+c) is 4; R^5, R^6, and R^7, are alkyl, cycloalkyl or aryl radicals with 1-18 carbon atoms optionally containing heteroatoms; said external electron donor compound being used in such an amount to give a weight ratio between the organo-aluminum compound and said electron donor compound of from 0.1 to 50."

X. With their reply to the statement setting out the grounds of appeal opponent 1 (respondent) submitted the following document:

D41: "Influence of Ziegler-Natta Catalyst Regioselectivity on Polypropylene Molecular Weight Distribution and Rheological and Crystallization

Behavior", J.C. Chadwick et al., Macromolecules, 2004, *37*, page 9722-9727.

XI. In preparation of oral proceedings foreseen for 10 February 2021, the Board issued a communication dated 20 November 2020 in which it indicated that it was minded to allow the appeal and to remit the case to the opposition division for further prosecution.

XII. With letter of 12 January 2021 the respondent withdrew its request for oral proceeding. With letter of 26 January 2021 the appellant agreed that a decision to remit the case to the opposition division could be taken in writing without holding oral proceedings. Oral proceedings were thereafter cancelled by the Board.

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

(a) The opposition division had ignored the established case law providing that an objection of lack of sufficiency of disclosure presupposes that there are serious doubts, substantiated by verifiable facts. Those facts were in the present case missing, as in particular no attempt had been made by the opponents to repeat the examples of the patent in suit.

(b) D28 and D40 confirmed that random propylene ethylene copolymers obtained from ZN heterogeneous catalyst did not show 2-1 regioinversion, unless as done in D28 monomers enriched in ^{13}C at the methyl C was used. The reasoning of the opposition division was based on mere allegations, no

indication being provided of what was missing to replicate the invention.

(c) The 2-1 absence of regioinversion and the molecular weight distribution defined in the claims were the result of the specific catalyst used in the present invention, reference being made to examples 1 to 4. It was also known by one skilled in the art that varying ethylene and hydrogen feed would provide the sought melt flow rate, ethylene content and related melting temperature.

(d) The invention was therefore sufficiently disclosed.

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

(a) The appellant's submission that the use of a ZN heterogeneous catalyst system, also based on a diether internal electron donor, would lead to the absence of 2-1 regioinversion was disproved by D28 and D41.

(b) It was agreed with the position of the opposition division that there was no straightforward, reliable disclosure of how to obtain parameter combinations showing the threshold values of the claimed ranges, as visualized by the sketch annex to the decision. The skilled person was confronted with an inventive task and undue experimental burden to figure out which catalyst systems including the necessary internal and external electron donors in the required amounts in combination with a specific set of reaction conditions could yield the required copolymers.

(c) The invention according to the main request was therefore insufficiently disclosed.

XV. The appellant requested that the decision under appeal be set aside and the case be remitted to the opposition division for further prosecution on the basis of the main request, or alternatively on the basis of the auxiliary request submitted with the statement of grounds of appeal (letter of 30 October 2017).

XVI. The respondent requested that the appeal be dismissed. The respondent further requested that the main request be not admitted into the proceedings. The respondent also requested that the case be remitted to the opposition division should issues other than sufficiency of disclosure or that relating to Article 123(2) EPC need to be discussed.

Reasons for the Decision

Admittance of the main request

1. Article 12(4) RPBA 2007 (which is applicable in the present case in view of Article 25(2) RPBA 2020) requires the Board to take into account everything presented by the parties under Article 12(1) RPBA 2007 if and to the extent that it relates to the case under appeal and meets the requirements in Article 12(2) RPBA 2007. It is not disputed that the main request submitted with the statement setting out the grounds of appeal, as well as the submissions in its respect, relate to the case under appeal and meet the requirements in Article 12(2) RPBA 2007. In particular,

it is apparent that the submissions of the appellant, i.e. the main request and the explanation as to why the subject-matter claimed meets the requirements of sufficiency of disclosure and those of Article 123(2) EPC, constitute an attempt to overcome the objections that led to the revocation of the patent in suit.

1.1 The respondent, however, is of the opinion that the Board should exercise its discretionary power conferred to it by Article 12(4) RPBA 2007 to hold inadmissible the present main request, as it could have been presented in the first instance proceedings.

1.2 The present main request differs from the Third Auxiliary Request underlying the contested decision in that claims 6 and 7 were deleted, process claims 8 and 9 were renumbered as claims 6 and 7 and the process of claim 6 was limited by introducing features (b) and (c) defining the use of an organo-aluminum compound and an external electron donor compound respectively, the process claim being further limited by defining the weight ratio between these compounds (b) and (c). Process claim 7 also corresponds to process claim 1 of the Fourth Auxiliary Request underlying the contested decision in which the feature defining the Melt Flow rate and the weight ratio between compounds (b) and (c) have been introduced.

1.3 The respondent argues that the amendment of the independent process claim does not in any way make the issue of sufficiency of disclosure to be discussed in respect of the main request different from that discussed before the opposition division with respect to the two requests underlying the decision. The Board has no reason to have a different opinion. The same holds true concerning the deletion of former dependent

claims 6 and 7. Moreover, as to the insertion of the feature defining the weight ratio between compounds (b) and (c), this amendment is in response to the objection raised for the first time during the oral proceedings by the opposition division that the insertion of the features defining compounds (b) and (c) without defining their weight ratio would contravene the requirements of Article 123(2) EPC. Therefore it could not be expected that the appellant presented this amendment to the claims earlier in the course of the opposition proceedings.

1.4 Under these circumstances the Board has no reason to make use of its discretionary power under Article 12(4) RPBA 2007 (in conjunction with Article 25(2) RPBA 2020) to hold the main request inadmissible. The main request is therefore in the proceedings.

Sufficiency of disclosure - main request

2. Having regard to the reasons for the contested decision and the respondent's arguments it is to be understood that the objections raised by the respondent against the main request concern its claim 1, although this was not explicitly indicated in the respondent's submissions of 9 March 2018. Despite the absence of a specific objection against claim 7 of the main request, it is also understood, having regard to the conclusion in the second paragraph on page 8 of the respondent's letter of 9 March 2018 and the similarities between the process claim of the main request and that of the auxiliary request that in fact both claims 1 and 7 of the main request are objected to on the basis of the same arguments. This was communicated to the parties in the Board's communication and was not disputed.

3. 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 in its whole extent without undue burden, i.e. with reasonable effort, which means in the present case to prepare propylene/ethylene copolymers meeting the combination of parameters defined by the terms of claim 1 or to carry out the process for their preparation as defined by the terms of claim 7, throughout the whole area(s) claimed, taking into account the information given in the patent in suit, using common general knowledge and routine experimentation.

According to the established case law (Case Law of the Boards of Appeal of the European Patent Office, 9th edition, 2019, 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. According to the case law (Case Law, II.C.7.1.4) the objection of lack of sufficient disclosure presupposes that there are serious doubts, substantiated by verifiable facts.

Preliminary remarks - Meaning of claim 1

4. With regard to the absence of 2-1 inversion, the normal rule of claim construction is that the terms used in a claim should be given their broadest technically sensible meaning in the context of the claim in which they appear. Accordingly, the absence of 2-1 inversion cannot be considered by the skilled person to refer to the abstract concept of an absolute absence of 2-1 inversion, but rather to the absence of signal whose intensity would be above the threshold value considered to be significant for the presence of 2-1 inversion when testing a sample of the claimed copolymer.

5. With regard to the central argument of the opposition division in the contested decision that it would have required undue burden for the skilled person to prepare copolymers having "*a parameter combination showing the threshold values of the claimed ranges*", since the wording "*threshold values*" is neither present, nor technically appropriate in the context of claim 1 of the requests underlying the contested decision, the Board understands this wording as defining the lower and upper numerical values of the parametric ranges defined in said claims. This also was not disputed by the parties.

6. The respondent argues in the penultimate paragraph on page 7 of their rejoinder that there is no straightforward, reliable disclosure of the entirety of critical features producing the disputed copolymers having an ethylene content of 6.1 to 7.0 %, a Mw/Mn in the range of 3.5 to 4.4 or 5.2 to 5.5, a Mz/Mw of 3.5 to 3.9 or < 2.9, and a melting temperature of 131 to 142 °C or < 127 °C, "*i.e. a parameter combination showing the threshold values of the claimed ranges*".

This argument is understood to refer to copolymers meeting this specific combination of parametric ranges, which combination however is not defined as such in present claim 1 or elsewhere in the patent in suit, i.e. this argument refers to an invention encompassed by the subject-matter of present claim 1, but different from that disclosed in the patent in suit. In this regard the Board considers that for an invention defined by a combination of parameter ranges as the present one, while it is reasonable to require that it is possible to obtain products with any value of a single parameter within the range given in the claim, while at the same time values of the other parameters within their respective ranges can be obtained by carrying out the teaching of the patent in suit, it is unreasonable to require the reproducibility of any theoretically conceivable combination of values when those combinations have not been shown to correspond to the claimed invention. Consequently, the argument in the penultimate paragraph on page 7 of the respondent's rejoinder fails to convince.

7. Moreover, the respondent's argumentation, which essentially corresponds to that provided in the reasons for the contested decision, reference being made to the sketch annexed to the contested decision (page 7 of the rejoinder, last sentence of the penultimate paragraph) is based on the assumption that the expressions "lower than 4" and "lower than 143°C" are meant to designate any value "up to 4, but excluding 4" and "up to 143°C but excluding 143°C", respectively. Such assumptions, however, are not correct. In contrast to the expressions "in the range of 4.5-7 %wt" and "in the range 3.5 to 5.5" defined in claim 1 for the ethylene content and the Mw/Mn ratio, respectively, the expressions "lower than 4" and "lower than 143°C" do

not define closed ranges, but only that the Mz/Mw ratio and the melting temperature (non-nucleated grade) must be below certain specific values defined in operative claim 1. Paragraphs [0011] and [0012] of the specification do not give rise to a different interpretation. Mz/Mw ratios and melting temperatures having values as low as zero, as depicted on the sketch attached to the contested decision, are obviously not technically sensible and cannot be seen as covered by the claim as understood by the skilled person giving a technically sensible meaning to it.

Teaching provided in the patent in suit

8. The teaching of the patent in suit referred to by the appellant, i.e. that contained in paragraphs [0017] to [0028] and [0030] of the specification, indicates the catalytic system and the polymerization conditions to be generally used for preparing the claimed copolymers. This teaching relates in particular to the type of internal donor selected from 1,3-diethers (paragraphs [0018] to [0024]), the nature of the catalyst and co-catalyst (paragraphs [0025] to [0027]) and the preferred external donor (paragraph [0028]). This general teaching is supplemented by the teaching of Examples 1, 3 and 4 showing the preparation of specific copolymers. The solid catalyst used in Examples 1, 3 and 4 is indicated to be prepared based on the teaching of Example 1 of European patent 728 769, i.e. D27 in the present proceedings. In accordance with the teaching provided in paragraphs [0017], [0018], [0022], [0025] and [0026] of the patent in suit, the catalyst used in Examples 1, 3 and 4 is a titanium compound having at least one titanium-halogen bond and at least an electron-donor compound (internal donor), both supported on a magnesium chloride compound. Said

catalyst is obtained using microspheroidal $MgCl_2$, $TiCl_4$ and 9,9-bis(methoxymethyl)fluorene, the latter being a compound listed in paragraph [0024], line 56 of the specification as an example of a 1,3-diether internal electron donor according to formula (III) defined in paragraph [0022]. The catalyst further comprises triethylaluminium as a co-catalyst and dicyclopentyl-dimethoxysilane as an external donor, also in line with the teaching of the patent in suit provided in paragraphs [0027] and [0028], respectively.

Absence of 2-1 regioinversion

9. Concerning the absence of 2-1 regioinversion, it is referred to points 7 and 8 of the Reasons of T 0089/13 according to which standard methods exist to measure the amount of 2-1 regioinversion, which methods make it possible to verify the absence of 2-1 regioinversion in the copolymer. While the appellant points out (last paragraph of page 6 of the statement of grounds of appeal) that the absence of 2-1 regioinversion can be obtained using the "*specific catalyst used in the present invention, denoted as preferred and used in the examples*", the respondent argues based on D28 (concerning the production of propylene/ethylene copolymers) and D41 (concerning the production of propylene homopolymers) that such a catalytic system based on a Ziegler-Natta catalyst with a diether internal electron donor would present significant level of 2-1 regioinversion.

9.1 However, as noted by the appellant in the last paragraph on page 4 of the statement of grounds of appeal, detection of 2-1 regioinversion in D28 was only possible, because a propylene enriched in ^{13}C at the methyl C was used for the preparation of the copolymer

(D28, page 7437, paragraph bridging the two columns and following paragraph). The detection of 2-1 regioinversion was carried out in the same way in D41 (page 9723, left-hand column, last paragraph), reference 12 mentioned in this paragraph corresponding to document D28 of the present appeal proceedings (see page 9727, section "References and Notes"). However, the invention as defined by operative claim 1 is not a propylene/ethylene copolymer whose propylene is enriched in ^{13}C at the methyl C.

9.2 Accordingly, the evidence based on D28 and D41 referred to by the respondent does not show that the use of the catalytic system taught in the patent in suit, in particular that used in Examples 1, 3 and 4 (see above point 8) is not sufficient to prepare a propylene/ethylene copolymer which does not present a measurable level of 2-1 regioinversion when using a method for identifying and quantifying 2-1 regioinversion which was standard in the art at the date of filing of the patent in suit, namely ^{13}C NMR spectroscopy (see point T 0089/13, point 7 of the Reasons). Moreover, as indicated by the appellant in the first paragraph on page 5 of the statement of grounds of appeal D40 indicates that isotactic polypropylene prepared from heterogeneous Ziegler-Natta catalysts do not present 2-1 regioinversion, in line with the teaching of the patent in suit.

9.3 Under these circumstances the Board has no reason to consider that the teaching of the patent in suit as far as the absence of 2-1 regioinversion is concerned is insufficient.

Mw/Mn and Mz/Mw

10. It is also not disputed that the skilled person based on the teaching of Examples 1, 3 and 4 referred to in above point 8 would have no difficulty to reproduce the copolymers described in these examples, i.e. to reproduce copolymers having no detectable 2-1 regioinsertion (i.e. when prepared with a propylene which is not enriched in ^{13}C) and exhibiting the combination of parametric values described in Table 1 of the specification, i.e. meeting the combination of parametric values defined in operative claim 1.

10.1 It can be taken from the appellant's submissions (statement of grounds of appeal, passage starting with the last full paragraph of page 6 and ending with the first full paragraph of page 7) that the molecular weight distribution of the propylene/ethylene copolymer, expressed by the parametric values Mw/Mn and Mz/Mw is essentially dependent on the catalytic system used, for which the patent in suit provide a general teaching, as well as a specific teaching for Examples 1, 3 and 4 (see above point 8). This is confirmed by a comparison of Examples 3 and 4 using the same catalytic system and in which an increase from 5 to 6 wt% of the ethylene content with almost the same hydrogen feed does not result in a change of the Mw/Mn ratio. As evidenced by D41 (page 9724, right-hand column, first full paragraph) and D40 (Table 2.1 on page 18) the skilled person is also aware that the molecular weight distribution is influenced by the choice of the Ziegler-Natta catalyst, in particular by the type of internal donor, diether internal donor providing a narrow molecular weight distribution. This also was not disputed by the respondent.

10.2 Moreover, the skilled person could glean from the examples of the patent in suit, at least in relation to the catalytic system used therein, additional teaching concerning the influence of the ratio of co-catalyst to external donor on the Mw/Mn and/or Mz/Mw values:

- A comparison of Examples 1 and 3 using similar conditions for the hydrogen and ethylene feeds shows that a decrease of the weight ratio of co-catalyst to external donor of 20% for Example 3 leads to a decrease of the melt flow rate, an increase of the Mw/Mn ratio and a decrease of the Mz/Mw ratio.

- A comparison of Example 2 and 3 using the same ethylene feed shows that a decrease of about 80% of the hydrogen feed and a decrease of the weight ratio of co-catalyst to external donor by 20% lead to a decrease of the melt flow rate and a slight decrease of the Mw/Mn and Mz/Mw ratios.

There is therefore a *prima facie* argument that the skilled person would find in the patent in suit the implicit information that for a given catalytic system, the weight ratio of co-catalyst to external donor can be varied to obtain Mw/Mn and/or Mz/Mw values which are below or above the specific values described in the examples.

Ethylene content, Melting Temperature and Melt Flow rate

11. The respondent did not dispute the appellant's position, in line with the opinion of the opposition division expressed in the third paragraph on page 5 of the contested decision, that the ethylene content and related melting temperature, and the melt flow rate (measured according to ISO 1133 (230°C, 2.16 Kg)) can

be obtained in line with common general knowledge by adjusting the ethylene and hydrogen feeds, respectively, independently from the sought absence of 2-1 regioinsertion and the molecular weight distribution (i.e. the Mw/Mn and Mz/Mw values) once an appropriate catalytic system has been selected in order to obtain the latter mentioned features.

Amount of experimental work required to reproduce the invention over its full scope

12. The opposition division argued that the skilled person starting from the examples of the patent in suit would be faced with an undue amount of experimental work to find the necessary internal and external donors in the required amounts, in particular the weight ratio of organo-aluminium compound to external electron donor, in combination with a specific set of reaction conditions yielding copolymers exhibiting the required parametric conditions as well as the absence of 2-1 regioinversion.

12.1 Based on the above analysis of the meaning of operative claim 1, the teaching of the patent in suit and the common general knowledge in the art, it is concluded that the skilled person using the catalytic system taught in the examples of the patent in suit and variations thereof, such as variations of the amount of the external donor, as well as variations of hydrogen and ethylene feed, would be able to produce the claimed copolymers without undue burden over a substantial portion of claim 1.

12.2 Even if the use of the catalytic system used in the examples, and possibly some variation of the ratio of co-catalyst to external donor, were not sufficient to

obtain with reasonable effort copolymers covered by the remaining less significant part of claim 1, which however was not demonstrated by the respondent, it would still not have been shown that the selection of a different diether as internal donor or other variation of the catalytic system used in accordance with the teaching of the patent in suit would require an undue amount of experimentation to obtain the molecular weight distribution defined in operative claim 1. The respondent in this respect did not attempt to repeat the teaching of the patent in suit using a diether as internal donor different from that used in the examples of the patent in suit or other variation of the catalytic system used in accordance with the teaching of the patent in suit.

12.3 Under these circumstances, the Board concludes that the respondent did not provide verifiable facts and evidence on the basis of which it can be seriously doubted that a skilled person, on the basis of the information provided in the patent specification and, if necessary, using common general knowledge, would be able to carry out the invention as claimed in its whole extent with reasonable effort.

Conclusion

13. In view of the above findings, the respondent's submissions do not represent a successful challenge under Article 100 (b) EPC to sufficiency of disclosure of the subject-matter of claim 1. That objection is therefore rejected. Considering that the arguments implicitly submitted by the respondent with respect to claim 7 are the same as for claim 1, the same conclusion applies to the subject-matter of claim 7 directed to a method for preparing the propylene/

ethylene copolymers of claim 1 in accordance with the teaching referred to in above points 9 and 10.

Remittal

14. Regarding the main request labelled "Third Auxiliary Request", the decision under appeal was based on the sole reason that its subject-matter was not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The board arrives at a different conclusion in respect of the present main request. However, the opposition division has not carried out, in the appealable decision, any examination of the further grounds of opposition invoked, i.e. novelty and inventive step. This constitutes "special reasons" within the meaning of Article 11 RPBA 2020 to remit the case for further prosecution to the department whose decision was appealed. Furthermore, the parties requested remittal of the case to the opposition division for further prosecution for the case the decision of the opposition division was set aside.

15. 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:

B. ter Heijden D. Semino

Decision electronically authenticated