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# Datasheet for the decision of 26 November 2025

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| **Case Number:** | T 0243/23 - 3.3.03 |
| **Application Number:** | 16727194.9 |
| **Publication Number:** | 3307820 |
| **IPC:** | C08L23/12 |
| **Language of the proceedings:** | EN |

**Title of invention:**
PROCESS FOR MANUFACTURE OF LOW EMISSION POLYPROPYLENE

**Patent Proprietor:**
SABIC Global Technologies B.V.

**Opponents:**
W.R. Grace & Co.-Conn.
Basell Poliolefine Italia S.r.l.
Borealis GmbH

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

**Keyword:**
Evidence submitted with the statement setting out the grounds of appeal and the reply thereto (admitted in part)
Inappropriate construction of the term "consisting of"
Sufficiency of disclosure (yes)
Remittal - special reasons for remittal

**Decisions cited:**
G 0002/98, G 0001/24, T 1845/14

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**Case Number: T 0243/23 - 3.3.03**

# DECISION
## of Technical Board of Appeal 3.3.03
## of 26 November 2025

|  |  |
|---|---|
| **Appellant:**<br>(Patent Proprietor) | SABIC Global Technologies B.V.<br>Plasticslaan 1<br>4612 PX Bergen op Zoom (NL) |
| **Representative:** | Sabic Intellectual Property Group<br>Sabic Intellectual Property Department<br>P.O. Box 3008<br>6160 GA Geleen (NL) |
| **Respondent 1:**<br>(Opponent 1) | W.R. Grace & Co.-Conn.<br>7500 Grace Drive<br>Columbia, MD 21044-4098 (US) |
| **Representative:** | Kutzenberger Wolff & Partner<br>Waidmarkt 11<br>50676 Köln (DE) |
| **Respondent 2:**<br>(Opponent 2) | Basell Poliolefine Italia S.r.l.<br>Via Pontaccio 10<br>20121 Milano (IT) |
| **Representative:** | LyondellBasell<br>c/o Basell Poliolefine Italia<br>Intellectual Property<br>P.le Donegani 12<br>44122 Ferrara (IT) |
| **Respondent 3:**<br>(Opponent 3) | Borealis GmbH<br>Trabrennstrasse 6-8<br>1020 Vienna (AT) |
| **Representative:** | Maiwald GmbH<br>Elisenhof<br>Elisenstraße 3<br>80335 München (DE) |

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| **Decision under appeal:** | **Decision of the Opposition Division of the European Patent Office posted on 30 November 2022 revoking European patent No. 3307820 pursuant to Article 101(3)(b) EPC.** |

**Composition of the Board:**

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|---|---|
| **Chairman** | D. Semino |
| **Members:** | F. Rousseau |
| | A. Bacchin |

## Summary of Facts and Submissions

I. The appeal by the patent proprietor lies against the decision of the opposition division revoking European patent No. 3 307 820.

II. Three oppositions had been filed based on the grounds for opposition under Article 100(a) in conjunction with Articles 54 and 56 EPC and under Article 100(b) EPC.

The decision was based on the patent as granted as the main request and auxiliary requests 1 to 29 filed with letter of 7 September 2022.

III. The proceedings before the opposition division were based having regard among others to documents:

D1: EP 2 144 962 B1
D2: WO 2008/074423 Al
D3: WO 2012/116719 Al
D4: WO 2011/008589 Al
D5: WO 01/36502 Al
D6: WO 2010/082943 Al
D7: US 2010/0168342 Al
D9: US 6,218,504 Bl
D12: E.P. Moore, The Rebirth of Polypropylene: Supported Catalysts, Hanser Publishers, 1998, pages 75-83
D46: Polyprpylene Bormod$^{TM}$ BJ368MO Datasheet
D63: Experimental Report signed by Lukas Sobczak, dated 18 August 2022
D64: Declaration by Mithun Goswami, dated 18 August 2022
D65: Declaration by Andreas Fuchs, dated 19 August 2022

D65b: Pergan, The Peroxide Company, Technical Bulletins
D65c: F. Testoni *et al.*, Risk Assessment of Plastic-based Food Contact Materials: Focus on Polyolefins, Royal Society of Chemistry, 2019
D66: Thesis by Sifiso Magagula, The effect of organic peroxides on the molecular composition of heterophasic ethylene-propylene impact copolymers, December 2015
D67: Polypropylene, An A-Z reference Edited by Karger-Kocsis, pages 393-395, 2012.

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

(a) In view of the term "*consisting of*" the definition of the heterophasic propylene copolymer in granted claim 1 excluded the presence of components other than the polypropylene matrix and the dispersed ethylene-α-olefin copolymer, such as additives and peroxide degradation impurities resulting from the visbreaking of a heterophasic propylene copolymer. For this reason none of the inventive examples of the patent in suit fell within the scope of claim 1.

(b) The wording of claim 1 being clear there was no need to refer to the description for its interpretation.

(c) Example BS2 of the application as filed (WO 2016/198344 Al) provided an additional indication that there was no clear guidance for the skilled person on how to perform the invention in such a way as to achieve the claimed MFR and FOG values.

(d) It was also impossible to execute the invention in accordance with claim 2, which excluded everything but the propylene matrix and the dispersed rubber phase, while still requiring visbreaking which necessarily led to side-products.

(e) Accordingly, the ground of opposition under Article 100 (b) EPC prejudiced the maintenance of the patent as granted.

(f) The same hold true for the auxiliary requests which all comprised a claimed subject-matter defined by a combination of the term "consisting of" and the process feature of "visbreaking".

(g) Consequently, none of the requests on file was found to fulfil the requirements of sufficiency of disclosure and the patent was for this reason revoked.

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

VI. With their statement of grounds of appeal, the appellant addressed among others the issue of sufficiency of disclosure and filed the following additional documents:

D70: D. Malpass and E. Band, Introduction to Industrial Polypropylene, Properties, Catalysts, Processes, Wiley, 2012, pages 235-239
D71: Oliani *et. al.*, Effects of thermal ageing on HMS-PP crystallinity, 2009, International Nuclear Atlantic Conference - INAC 2009
D72: https://studylib.net/doc/25637582/polypropylene-degradation-control-1.

With the same letter, auxiliary requests 1 to 29 were also submitted.

VII. With their reply to the statement of grounds of appeal opponents 1, 2 and 3 (hereafter respondents 1, 2 and 3, respectively) addressed among others the issue of sufficiency of disclosure.

VIII. Respondent 3 submitted with the rejoinder the following documents:

D73: ISO 1133, 17 June 2005
D74: Declaration of Lukas Sobczak, dated 8 August 2023
D75: Declaration of Andreas Albrecht, dated 17 August 2023
D75a: K. Hammerschmid & M. Gahleitner, Controlled rheology polypropylene, Polypropylene: An AZ Reference, Kluwer publishers, 1998, pages 93-103.
D75b: M. Sandholzer *et al.*, Peroixde-induced degradation of impact PP: the influence of rubber design, Proceedings of the Polymer Processing Society 26th Annual Meeting - PPS26, October 20-23, 2010 Istanbul
D75c: Y. Shangguan *et al.*, Study on degradation and crosslinking of impactpolypropylene copolymer by dynamic rheological measurement, Polymer, 51 (2010), pages 500-506
D75d: L. Jeremic *et al.*,(2020) Rapid characterization of high-impact ethylene-propylene copolymer composition by crystallization extraction separation: comparability to standard separation methods, https://doi.org/10.1080/1023666X.2020.1821151.

IX. Following a stay of the appeal proceedings in view of referral G 1/24, the appeal proceedings were resumed and a communication pursuant to Article 15(1) RPBA conveying the Board's provisional opinion was issued.

X. Oral proceedings before the Board were held on 26 November 2025 with the participation of all parties.

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

The appellant requested that the decision under appeal be set aside and the case be remitted to the opposition division for assessing the undecided grounds of opposition under Article 100(a) EPC on the basis of the patent as granted as the main request or any of the auxiliary requests 1 to 29 filed with the statement of grounds of appeal.

The respondents requested that the appeal be dismissed. In the alternative the respondents requested that the case be remitted to the opposition division for the remaining grounds of opposition, should the main request or one of the auxiliary requests be found to meet the requirements of sufficiency of disclosure.

XII. The claims which are relevant to the present decision are claims 1, 2, 3 and 9 of the patent as granted (main request) which read as follows:

"1. Heterophasic propylene copolymer consisting of a propylene-based matrix and a dispersed ethylene-α-olefin copolymer, wherein the heterophasic propylene copolymer has a melt flow rate of at least 40 g/10min as determined in accordance with ISO 1133 (230°C, 2.16 kg) and a FOG value of at most 350 µg/g as determined by VDA 278.

2. Heterophasic propylene copolymer according to claim 1, which heterophasic propylene copolymer is obtained by visbreaking of an intermediate heterophasic propylene copolymer in a shifting ratio, which complies with the following formula:
$0.0011x^2 - 0.011x + 1 \leq \text{shiftingratio} \leq -0.0009x^2 + 0.1963x + 1$
wherein x stands for the melt flow rate of the final heterophasic propylene copolymer obtained after visbreaking of the intermediate heterophasic propylene copolymer,
wherein the shifting ratio is the melt flow rate of of [sic] the final heterophasic propylene copolymer divided by the melt flow rate of the intermediate heterophasic propylene copolymer,
wherein the melt flow rates are determined in accordance with ISO1133 (230°C, 2.16kg).

3. Heterophasic propylene copolymer according to claim 1 or claim 2, wherein the heterophasic propylene copolymer consists of

(a) a propylene-based matrix,
wherein the propylene-based matrix consists of a propylene homopolymer and/or a propylene-α-olefin copolymer consisting of at least 70 wt% of propylene and at most 30 wt% of α-olefin, based on the total weight of the propylene-based matrix and
wherein the propylene-based matrix is present in an amount of 60 to 95 wt% based on the total heterophasic propylene copolymer and
(b) a dispersed ethylene-α-olefin copolymer,
wherein the dispersed ethylene-α-olefin copolymer is present in an amount of 40 to 5 wt% based on the total heterophasic propylene copolymer and

wherein the sum of the total amount of propylene-based matrix and total amount of the dispersed ethylene-α-olefin copolymer in the heterophasic propylene copolymer is 100 wt%.

9. Process for the manufacture of a heterophasic propylene copolymer of any one of claims 1 - 8, comprising the subsequent steps of:

I) polymerizing monomers to obtain an intermediate heterophasic propylene copolymer having an intermediate melt flow rate and
II) II) [sic] visbreaking said intermediate heterophasic propylene copolymer, for example during extrusion directly after step I), to obtain the heterophasic propylene copolymer having said target melt flow rate and said FOG value and wherein the ratio of the target melt flow rate to the intermediate melt flow rate is more than 1,

wherein step I) is performed in the presence of a catalyst system comprising a Ziegler-Natta catalyst and at least one external electron donor chosen from the group consisting of a compound having a structure according to Formula III $(R^{90})_2N\text{-}Si(OR^{91})_3$, a compound having a structure according to Formula IV: $(R^{92})Si(OR^{93})_3$ and mixtures thereof wherein each of $R^{90}$, $R^{91}$, $R^{92}$ and $R^{93}$ groups are each independently a linear, branched or cyclic, substituted or unsubstituted alkyl having between 1 and 10 carbon atoms, preferably wherein $R^{90}$, $R^{91}$, $R^{92}$ and $R^{93}$ groups are each independently a linear unsubstituted alkyl having between 1 and 8 carbon atoms, preferably ethyl, methyl or n-propyl, more preferably wherein the at least one external electron donor is chosen from the group of diethylaminotriethoxysilane (DEATES), n-propyl

triethoxysilane, (nPTES), n-propyl trimethoxysilane (nPTMS) and mixtures thereof,
preferably wherein step I) involves
ia) polymerizing propylene and optionally α-olefin in the presence of the catalyst system to obtain the propylene-based matrix and
ib) subsequently polymerizing ethylene and α-olefin in the propylene-based matrix in the presence of the catalyst system to obtain the dispersed ethylene-a olefin copolymer."

XIII. 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 concerned (i) admittance of documents D70 to D75 and D75a to D75d, (ii) the meaning to be attributed to the term "consisting of" in the context of claim 1 as granted and (iii) the question whether sufficiency of disclosure could be acknowledged.

## Reasons for the Decision

### *Admittance of documents D70 to D75 and D75a to D75d*

1. The submission of documents D70 to D72 which have been filed by the appellant with their statement of grounds of appeal is to be regarded as an amendment to that party's case within the meaning of Article 12(4) RPBA. Their admittance to the proceedings, which is contested by the respondents, is subject to the discretionary power of the Board in accordance with Article 12, paragraphs (4) to (6) RPBA.

D70 to D72 are documents meant to prove that for the skilled person stabilizing agents and side products of visbreaking are necessarily part of the claimed heterophasic propylene copolymer.

Respondents 1 and 2 bring forward that documents D70, D71 and D72 should have been submitted before the opposition division, in particular according to respondent 1 in direct response to the preliminary opinion of the opposition division, and for this reason should not be admitted. In order to decide whether this the case, it is useful to consider the position of the parties before the opposition division concerning the interpretation of the term "consisting of".

With the notice of opposition respondent 1 submitted that a narrow claim interpretation in view of the "consisting of" language would result in a lack of sufficiency, since it appeared that the low FOG values of the exemplified heterophasic propylene copolymers were achieved merely because of the presence of unspecified additives which were excluded from granted claim 1 (section 4 starting on page 12). It is however not apparent that respondent 1 was of the view that such a narrow interpretation should be taken, in particular having regard to the prior art cited in relation to novelty and inventive step.

In their notice of opposition, the respondent 2's argument concerning the alleged insufficient disclosure was that the invention could not be performed over the whole scope of claim 1 having regard to example BS2 of the application as filed with a shifting ratio fulfilling the inequation of claim 2, but not the FOG value of claim 1 (section 4 on page 3). In addition, it was objected that both D4 and D5 (referred to by respondent 2 as D8 and D9, respectively) using the same process as in the patent in suit in order to prepare an heterophasic copolymer by visbreaking of an intermediate stabilized heterophasic copolymer using peroxide were novelty destroying for the subject-matter of claim 1 (sections 5.2 and 5.3 on pages 5 to 7). In other words, respondent 2 did not construe claim 1 as excluding stabilizers and residues of peroxides.

Respondent 3 was also of the opinion that claim 1 had to be construed broadly and could not exclude further polymeric materials such as other heterophasic copolymers, fillers such as talc and that a broad interpretation was necessary in view of claim 2 referring back to claim 1 (notice of opposition, item 11). Insufficiency of disclosure was objected to, since the experimental part of the patent in suit was held not to include all essential features (notice of opposition, item 28). On that basis, respondent 3 also did not construe claim 1 as excluding additives or residues from peroxide.

In its preliminary opinion (point 13), the opposition division did not discuss a broad interpretation of granted claim 1, arguing that claim 1 was clear so that there was no need to refer to the description for its interpretation. On that basis the opposition division indicated that they tended to be of the opinion that (i) peroxide degradation impurities could not be included in the claimed composition due to the term "consisting of" and (ii) none of the inventive examples fell under granted claim 1, as they all described the use of additives. The opposition division, however, did not take position on the appellant's argument that in view of claim 2, peroxide degradation products and stabilisers were considered to be part of the propylene based matrix and/or the dispersed ethylene-α-olefin copolymer (reply to notices of opposition, page 7, item 27).

In response to the preliminary view of the opposition division, the appellant pointed out that the interpretation made by the opposition division was incorrect, as it completely disregarded the whole disclosure of the patent. It was referred to claim 2, which showed that the use of a visbreaking step was within the scope of claim 1, meaning that a technically sensible interpretation of claim 1 was that it included heterophasic propylene copolymers prepared using visbreaking with peroxides, in line with the disclosure of the patent in suit (appellant's letter of 7 September 2022, items 179 and 180).

During the oral proceedings before the opposition division, the focus of the debate concerning sufficiency of disclosure was put on the impossibility to execute the invention, since claim 1 in view of the "consisting of" wording excluded side-products, including peroxide by-products, or a change of phase structure of the composition due to crosslinking, reference being made to D63 to D65c and D66 to D67, the composition obtained after visbreaking being not more "consisting of" (minutes, page 2, second and third paragraphs and page 4, second full paragraph).

Having regard to the absence of comment of the opposition division on the relevance of granted claim 2 for the meaning of claim 1 in the preliminary opinion and the focus of the debate during the oral proceedings on the exclusion of side-products, it is apparent that the discussion on the meaning to be attributed to "consisting of" within the meaning of granted claim 1 and its implication as to which kind of constituents were excluded from the definition of the heterophasic propylene copolymer had not been fully developed before the oral proceedings.

Whereas D70 is concerned with the critical importance of preventive oxidative degradation of polypropylene and the presence of antioxidants for this purpose (page 236, penultimate and last paragraphs; page 237, last paragraph), D71 provides information about visbreaking of polypropylene using peroxides and products resulting from the oxidative degradation (abstract). Those documents are therefore relevant to determine what the skilled person at the effective filing date of the patent in suit would understand about the nature of heterophasic propylene copolymers and their constituents, in particular when a propylene-based matrix and a dispersed ethylene alpha olefin copolymer are subjected to visbreaking.

On that basis, the Board considered it appropriate to exercise its discretion under Article 12(4) RPBA in admitting documents D70 and D71 into the proceedings.

D70 and D71 being admitted into the proceedings, it was also appropriate for reasons of fairness that the Board exercised its discretion under Article 12(4) RPBA by also admitting prior art documents D74, D75 and T75a to D75c submitted by respondent 3 in response to the filing of D70 and D71. This is because these documents submitted by respondent 3 are concerned with the nature of heterophasic propylene copolymers and their constituents, in particular when a propylene-based matrix and a dispersed ethylene alpha olefin copolymer are subjected to visbreaking.

Concerning D72, having regard to literature 18 cited on page 39 of this document, which refers to a conference in 2020, it must be concluded that this document was made public some years after the effective date of filing of the patent in suit. Moreover, the disclosure of D72 does not allow for a determination of the information reported therein which was known to the public before the filing date of the patent in suit. The same holds true for D75d having a publishing date of 2020.

On that basis, D72 and D75a cannot be considered to represent the common general knowledge to be taken into account to assess the meaning of operative claim 1 at the effective date of filing of the patent in suit and for this reason are not suitable to address the issue which led to the decision under appeal. The Board therefore exercised its discretion under Article 12(4) RPBA in not admitting D72 and D75a into the proceedings.

As to document D73, its admittance was not contested by the parties and the Board sees no reasons not to admit it into the proceedings. As in the end the document was not relevant for the decision, there is no need to give any more detail about it.

### *Main request (patent as granted)*

2. The pivotal issue in the reasons for the contested decision and the parties' submissions in appeal is the meaning to be attributed to the subject-matter of granted claim 1, in particular whether its definition allows for the presence of residues of peroxide used for visbreaking an intermediate heterophasic propylene copolymer, so as to obtain a heterophasic propylene

copolymer having the MFR and a FOG value required in operative claim 1.

In this regard, according to decision G 1/24 the claims are the starting point and the basis for assessing the patentability of an invention under Articles 52 to 57 EPC. The description and drawings shall always be consulted to interpret the claims when assessing the patentability of an invention under Articles 52 to 57 EPC, and not only if the person skilled in the art finds a claim to be unclear or ambiguous when read in isolation (Order).

There is no reason to consider a different approach when assessing sufficiency of disclosure, since 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 (see decision T 1845/14, Reasons, point 9.6).

A decision on the ground for opposition under Article 100 (b) EPC therefore necessitates in a first step to set out how the skilled person understands the definition of claim 1 in context with the description and drawings, as ruled in G 1/24.

*Meaning of "consisting of" and construction of claim 1*

3. 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. What is decisive for the meaning to be attributed to claim 1 is what a person skilled reading that claim would understand from it, account also being taken of the common general knowledge at the date of filing of the patent in suit.

3.1 Claim 1 is directed to a heterophasic propylene copolymer consisting of a propylene-based matrix and a dispersed ethylene-α-olefin copolymer, wherein the heterophasic propylene copolymer is defined to have a minimum melt flow rate (MFR) and a maximum FOG value.

It can be agreed with respondent 3 that beside the analysis of the term "consisting of", a proper understanding of the subject-matter defined by claim 1 requires an analysis of the meaning of "matrix" and "dispersed" (rejoinder, page 6, first paragraph of section D.I). Since these terms are defined in the context of heterophasic propylene copolymers, it is first necessary to consider the meaning attributed by the skilled person to "heterophasic propylene copolymer".

3.2 In this respect, the term copolymer should not be seen in the usual sense, i.e. a polymeric chain obtained by copolymerisation of two or more monomer species. As pointed out by respondent 1, heterophasic propylene copolymers, also known as impact propylene copolymers or propylene block copolymers, are conventionally composed of a propylene-based matrix and a dispersed ethylene-α-olefin copolymer (rejoinder, page 2, point

3.2, second paragraph), i.e. are conventionally consisting of a propylene-based matrix and a dispersed ethylene-α-olefin copolymer. This is illustrated in D66 (paragraph bridging pages 2 and 3; page 8, Figure 2b; page 9, paragraph before the figure; page 15, last paragraph), D75b (page 2, first paragraph of the section "Results and discussion") and D75c (page 502, left hand column, first full paragraph).

Hence, read in the context of heterophasic propylene copolymers the term "consisting of" as used in granted claim 1 clearly refers to the morphology of the claimed compounds and the physical nature of the phases, either as matrix phase or dispersed phase.

3.3 While those matrix and dispersed phases are identified in claim 1 using chemical names, that definition, however, is of generic nature or conventional and clearly not intended to define the exact chemical nature of those phases. Whereas the term "propylene-based matrix" covers by definition a broad variation of the chemical nature of the matrix, the term "ethylene-α-olefin copolymer" is commonly used as a generic name or label for the dispersed phase whose chemical nature, although it is known to be based on the polymerisation of ethylene and an α-olefin, is according to the common general knowledge and therefore the reading of the skilled person much more complex than a polymeric chain composed of repeating units of ethylene and an α-olefin. It can be for example referred to D5 (page 1, lines 10-14) "*The rubbery copolymer phase is a reactor blend of an amorphous rubber, a rubber-like polymer which is normally an ethylene-propylene copolymer (rubber), and a semicrystalline ethylene copolymer*" and D66 (page 7, last full paragraph and paragraph bridging pages 7 and 8; page 15, last paragraph).

Accordingly, the presence of the term "consisting of" in granted claim 1 does not restrict the nature of the chemical composition of the claimed heterophasic propylene copolymer to the sole presence of polymeric chains of a propylene-based matrix and of an ethylene-α-olefin copolymer.

It follows from the above that claim 2 is not in contradiction to claim 1, even if the former were read to implicitly define that the visbreaking step is carried out using organic peroxides, which would result in the presence of peroxide impurities in the claimed product. In other words, contrary to the position of respondent 2, the reading of claim 1 that allows for the presence of further components in addition to the polymeric chains of a propylene-based matrix and of an ethylene-α-olefin copolymer is not made in view of claim 2 being seen to be inconsistent with claim 1, i.e. as to necessitate a broader interpretation of the latter.

3.4 The analysis in above points 3.2 and 3.3 is also in agreement with the submissions of respondent 3 (rejoinder, items 26 and 28), namely "*The Board is herewith informed that the phases being denoted "matrix" and "dispersed ethylene alpha olefin copolymer" may be made visible by transmission electron microscopy (TEM). However, the structure and features thereof can only be analyzed by fractionation experiments followed by NMR analysis. The typical approach for fractionation experiments is cold xylene solubility. A cold xylene soluble fraction is obtained which reflects essentially the dispersed ethylene alpha olefin copolymer*" and "*In the case of visbreaking, crosslinking of some minor amount of the matrix and* *some minor amount of the dispersed alpha olefin rubber occurs. This results in occurrence of a further polymeric component(s), so called gels. The amount of such polymeric component ("gels") can be determined by xylene hot insolubles (XHI). In addition to that the material as being insoluble in Crystex analysis, i.e., the automated instrumental method, also allows to evaluate the presence of a third fraction. Evidence is provided by D75*".

The conclusion in the last paragraph of above point 3.3 is also in agreement with the position of respondents 2 and 3 in their notices of opposition (see point 1 above, fifth and sixth paragraph).

3.5 The above analysis is also in agreement with the common general knowledge concerning conventional industrial processes for the manufacture of heterophasic propylene copolymers (impact copolymers), which is reflected in the monograph D12 cited by respondent 1 (rejoinder, pages 3 to 6, sections 3.5 and 3.6). It can be referred in this respect to Figures 6.1 to 6.3 and 6.8 of D12 showing schemes for such industrial processes from which it can be taken that those production process include the addition of additives and an extrusion step of the product obtained, whereby the obtained product is described in Figure 6.8 to be in the form of pellets. Hence, according to common general knowledge, the term "heterophasic propylene copolymer" refers to a physical entity, in agreement with the definition of that product having a certain phase morphology (matrix and dispersed phases), but not to chemical composition *per se*. This, however, does not preclude that the chemical composition of said phases be also defined, as in operative claim 1.

This is in line with the position of the appellant in the statement of grounds of appeal (page 13, section 35) according to which the use of the technical terms propylene homopolymer, propylene-α-olefin copolymer or ethylene-α-olefin copolymer may conventionally also refer to the physical form comprising these base polymers, such as pellets or granules, i.e. these polymers in their final form. It can be referred in this regard to D65c (second page, first paragraph of the introduction), D9 (column 2, lines 29-34) and D46 (page 1, section "Description"), the latter concerning a commercial product of respondent 3 also described as polypropylene heterophasic copolymer for injection moulding, which is implicitly described to comprise a nucleating agent.

How such terms referring to chemical names are to be read in a claim depends on the context in which said terms appear. In the present case, the chemical terms used in granted claim 1 are to be read in the context of "heterophasic propylene copolymer" or impact propylene copolymers or propylene block copolymers (see above point 3.3). They do not merely define a chemical composition, but rather refer to the base polymers of the matrix and dispersed phases of the claimed product, which therefore may contain additives usual in the art.

As a further indication for the skilled person that the the term "consisting of" does not strictly refer to the chemical names appearing in claim 1 is that it would exclude catalyst residues from the claimed product, which is technically not sensible, as a catalyst, such as a Ziegler-Natta catalyst specified in the claims of the opposed patent, is necessarily used for producing the product and undisputedly remains therein. It is referred in this regard to D66 (pages 14 and 15), as well as to the submissions of respondent 2 (rejoinder, page 4, item 4.5).

3.6 Moreover, it is plain that operative claim 1 is defined in accordance with Rule 43(1) (a) and (b) in the two-part form, whereby the statement "Heterophasic propylene copolymer consisting of a propylene-based matrix and a dispersed ethylene-α-olefin copolymer" designates the subject-matter of the invention and those technical features which are necessary for the definition of the claimed subject-matter but which, in combination, form part of the prior art, i.e. the conventional definition of heterophasic propylene copolymer, and wherein the heterophasic propylene copolymer has a MFR of at least 40 g/10 min as determined in accordance with ISO 1133 (230°C, 2.16 kg) and a FOG value of at most 350 µg/g as determined by VOA 278 is clearly the characterising portion of claim 1 which specifies the technical features for which, in combination with the features stated under sub-paragraph (a), protection is sought.

In that sense, examples of heterophasic propylene copolymer consisting of a propylene-based matrix and a dispersed ethylene-α-olefin copolymer are known from documents D1 to D7, as submitted by respondent 1 (rejoinder, page 2, section 3.2, third paragraph). As shown in D5, said heterophasic copolymer contains residues of organic peroxides, since it is prepared by visbreaking a heterophasic propylene copolymer in the presence of such peroxides (examples 1 to 8).

3.7 Moreover, it is undisputed that all examples of the specification, in agreement with the general teaching provided therein, consistently describe a process of preparing the heterophasic propylene copolymer which involves visbreaking of an intermediate heterophasic propylene copolymer using organic peroxide and additives, which process leads to products comprising in addition to the polymeric entities obtained, organic peroxide residues, additives and catalysts.

Accordingly, the description of the specification do not lead to a construction of operative claim 1 that differs from the one the skilled person would make having regard to the wording of that claim and the common general knowledge.

*Assessment of sufficiency of disclosure*

4. According to the established case law of the Boards of Appeal of the EPO, a European patent complies with the requirements of sufficiency of disclosure if the 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 the whole range claimed without undue burden, i.e. with reasonable effort.

The invention in accordance with operative claim 1 is directed to a heterophasic propylene copolymer consisting of a propylene-based matrix and a dispersed ethylene-α-olefin copolymer, wherein the heterophasic propylene copolymer is defined to have a MFR of at least 40 g/10min as determined in accordance with ISO 1133 (230°C, 2.16 kg) and a FOG value of at most 350 µg/g as determined by VDA 278.

*Teaching comprised in the specification*

4.1 The product of operative claim 1 is taught in the specification to be obtainable by a process as defined in paragraphs [0013] and [0035] of the specification, corresponding to the process described in claim 9, i.e. a process in which an intermediate heterophasic propylene copolymer is visbroken so as to increase the MFR to the target MFR defined in operative claim 1. Such visbreaking step is taught in detail in paragraphs [0112] to [0115], whereby numerous examples for the production of an heterophasic propylene copolymer meeting the parametric requirements of operative claim 1 are described in paragraphs [0138] to [0150].

Moreover, the patent in suit teaches how the FOG values are influenced by the visbreaking step. The visbreaking of a heterophasic propylene copolymer to higher MFR is indicated to commonly result in increased FOG values (paragraph [0151]), whereby peroxide shifting an heterophasic propylene copolymer with a lower intermediate MFR to a high final MFR is taught to lead to higher FOG values due to the large concentration of peroxide required to reach the target MFR value as compared to peroxide shifting of an heterophasic propylene copolymer with a somewhat higher intermediate MFR to the same final MFR (paragraph [0152]).

This teaching concerning the selection of a MFR for the intermediate heterophasic propylene in order to obtain a product having the target MFR and also complying with the FOG value requirement of claim 1 is expressed in the double inequation provided in paragraph [0153] and operative claim 2, which inequation gives guidance to the skilled person on how to adjust the MFR of the heterophasic propylene copolymer which is to be visbroken. The person skilled in the art is also taught that the MFR of the intermediate heterophasic propylene copolymer can be achieved for example by varying the MFR of the propylene homopolymer, the MFR of the rubber phase or the amount of RC the rubber phase (paragraph [0152] with "RC" as defined in paragraph [0148]).

Moreover, although this is described as an optional step, the patent in suit teaches that the FOG values can be further reduced by performing a venting, purging or degassing step, which steps are all known to the person skilled in the art, i.e. by maintaining the polypropylene obtained from the visbreaking step at an elevated temperature for a time sufficient to reduce the FOG value of the heterophasic propylene copolymer (paragraphs [0119] to [0121]).

On that basis, the Board is satisfied that the patent in suit teaches the skilled person at least one way for carrying out the claimed invention.

4.2 The conclusion by the opposition division of an insufficient disclosure was based on an erroneous construction of granted claim 1 which excluded for the claimed product the presence of components other than the polypropylene matrix and the dispersed ethylene-α-olefin copolymer, such as additives and peroxide degradation impurities resulting from the visbreaking of a heterophasic propylene copolymer. It is therefore manifest that in view of the construction of claim 1 in above section 3 the Reasons given in the contested decision cannot demonstrate a lack of sufficiency of disclosure of the subject-matter of operative claim 1.

4.3 The same applies to the arguments submitted by the respondents which are also based on an incorrect meaning of "consisting of" as to refer to the list of chemical species constitutive of the claimed product.

4.3.1 This concerns the argument by respondent 2 during the oral proceedings that operative claim 1 was directed to a heterophasic propylene copolymer, but not to a composition comprising the latter, meaning that operative claim 1 would allow in addition to the propylene-based matrix and the ethylene-α-olefin copolymer only for the presence of unavoidable impurities, i.e. the polymerization catalyst, but exclude the presence of ancillary elements such as peroxide impurities resulting from a visbreaking step.

In the opinion of respondent 2 this understanding of claim 1 would result in an insufficient disclosure, as the heterophasic propylene copolymer were theoretically also obtainable without such a visbreaking step using organic peroxides, but such a process was not disclosed.

This argument is irrelevant and therefore not convincing, because the subject-matter claimed is not directed to a process by which the product meeting the parametric requirements of claim 1 is obtainable without such a visbreaking step using organic peroxides.

4.3.2 The same applies to the argument by respondent 3 that visbreaking using organic peroxide, as used in all examples of the patent in suit, would not lead to a product consisting of a propylene-based matrix and a dispersed ethylene alpha olefin copolymer, as also defined in claim 3, in which it was made clear that the the sum of the total amount of propylene-based matrix and total amount of the dispersed ethylene-a-olefin copolymer in the heterophasic propylene copolymer is 100 wt%.

The same conclusion is also valid for the additional argument of respondent 3 that claim 3 also excludes for the presence of polymer fractions other than those defined in operative claim 1, although there was clear evidence for the fact that a third polymer fraction (potentially also a fourth fraction) other than "polypropylene matrix" and "dispersed ethylene alpha olefin copolymer" would be present when visbreaking is carried out (rejoinder, items 29 and 30). This argument is also based on the incorrect assumption that the terms "polypropylene matrix" and "dispersed ethylene alpha olefin copolymer" merely define chemical species (see above points 3.2 and 3.3).

While it is undisputed that a visbreaking step using peroxide results in additional chemical products, as not only degradation of polypropylene, but also branching, chain transfer and cross-linking of PE-sequences and ethylene-propylene-rubber (EPR) can occur (D75b, page 1, introduction and page 2, first paragraph of section "Result and Discussion"), the resulting product in the absence of any evidence to the contrary is considered to also consist of a dispersed phase and a matrix phase, whose chemical compositions have been modified by the visbreaking step. It can be referred to the passage of the same document on page 3, left column, 5th to 9th lines from the bottom, according to which scanning electron microscopy performed on cross sections of injection moulded specimen revealed that the decrease in toughness upon visbreaking is not related to a change of the phase morphology (particle size of the EPR).

*Arguments of the respondents based on a proper construction of claim 1*

4.4 Having regard to example BS2 of the application as filed which follows the teaching given in paragraph [0153] and operative claim 2 of the patent specification, but does not concern a heterophasic propylene copolymer having a FOG value in accordance with operative claim 1, the respondents submitted that the teaching of the patent in suit was insufficient to achieve at the same time the MFR and FOG requirements of granted claim 1.

This is not convincing.

Firstly, example BS2 of the application as filed relates to a situation in which the shift ratio is close to the maximum value defined by the double inequality of claim 2. In this respect, the appellant showed that, depending on the number of digits after the decimal point use to indicate the MFR value, the shift ratio could be in the case of example BS2 slightly below or above the maximum value defined by the double inequation of claim 2 (statement of grounds of appeal, sections 95 to 98).

Although the patent in suit is silent on the criticality of the number of decimal places used to report the MFR, this example at the upper limit of the shifting ratio already demonstrates that the double inequation set out in claim 2 constitutes a useful indicator of the shifting ratio and therefore of the MFR of the intermediate heterophasic propylene copolymer to be prepared in order obtain a heterophasic propylene copolymer meeting the parametric requirements of operative claim 1.

Moreover, respondent 3 also noted that paragraph [0120] of the specification teaches that "*In some embodiments, it is possible to further reduce the FOG value of the heterophasic propylene copolymer according to the invention by performing the step III) of maintaining the polypropylene obtained from step II) at an elevated temperature for a time sufficient to reduce the FOG value of the heterophasic propylene copolymer as determined in accordance with VDA 278*" (letter of 3 July 2025, page 3, last paragraph before item 8).

This is in agreement with the position of respondent 1, according to which a reduction of the FOG emission can be easily achieved by maintaining heterophasic propylene copolymers at a certain elevated temperature for a certain amount of time, which is just a matter of reaction conditions such as temperature, pressure and time (rejoinder, pages 2 and 3, section 3.3). In other words, such an additional treatment taught in paragraphs [0119] to [0121] of the specification (see above point 4.1, last paragraph) does not require inventive skills, but only some routine experimental work.

This is in particular true for a FOG value which is already close to the upper limit of 350 µg/g defined in operative claim 1 without a treatment at elevated temperature, which is the case for example BS2 concerning a heterophasic propylene copolymer with a FOG value of 375 µg/g after the visbreaking step.

Moreover, contrary to the argument of respondent 2 during the oral proceedings, paragraph [0006] of the specification would not discourage the skilled person to use the additional venting step explicitly taught in paragraph [0120] of the specification. The disadvantages resulting from the use of a venting step which are described in paragraph [0006], namely additional costs and negative effects on the optical properties due to partial thermal degradation, obviously concern methods in which a virgin reactor powder is treated, but no visbreaking of an intermediate heterophasic propylene copolymer takes place, which visbreaking step allows for the production of heterophasic propylene copolymers having the same MFR to lower FOG emissions (paragraph [0151] of the patent in suit).

The argument of respondent 3 during the oral proceedings that the use of such an additional step would be problematic in view of the definition of process claim 9 which does not recite said additional treatment is also not convincing, because process claim 9 is defined in an open manner so as to allow for the use of further steps in addition to those explicitly mentioned therein.

4.5 Respondent 1 also brought forward that if the claimed heterophasic propylene copolymer included other components such as unreacted monomers, catalyst residues, side products from reactions different from the targeted reaction, modified (e.g. crosslinked) chains which may be considered side products and the like, the question would remain "*how FOG values of at most 350 µg/g can be achieved in accordance with the opposed patent if the all [sic] of these other components are still present with in the inventively claimed heterophasic propylene copolymer with no limitation of the quantities thereof, no specific information in this regard*" being given in the patent-in-suit (rejoinder, page 10, fourth and fifth full paragraphs).

This argument is based on the unsubstantiated allegation that the skilled person putting into practice the process taught in the specification would obtain a heterophasic propylene copolymer having a large amount of volatile compounds corresponding to FOG values much higher than 350 µg/g. In the absence of any evidence in this respect, this argument is also rejected. Concerning the presence of unreacted monomers, those can be removed directly after polymerisation and before the visbreaking, as taught in paragraph [0112] of the specification, which removal step should not be confused with a venting, degassing or purging step, as mentioned in paragraph [0004] of the specification describing a method of the prior art.

4.6 Having regard to the definition in dependent claim 2 of a visbreaking step, respondent 2 argued at the oral proceedings that claim 1 was broad enough to cover products which are obtainable by a process which does not comprise a visbreaking step using organic peroxides. In the absence of a corresponding teaching in the patent in suit, such embodiments of operative claim 1 would be insufficiently disclosed.

This is not convincing, because the subject-matter of claim 1 is not directed to a process, let alone a process an embodiment of which is set out to be without a visbreaking step using organic peroxides (see above point 4.3.1). Moreover, an invention is according to established Case Law sufficiently disclosed if at least one way is clearly indicated enabling the person skilled in the art to carry out the invention in the whole range claimed (Case Law of the Boards of Appeal of the EPO, 11th edition 2025, I.C.5.2), which the Board answers in the affirmative for the product generally defined in operative claim 1, taking into account the teaching of the specification to use a peroxide shifting step of an intermediate heterophasic propylene copolymer having a lower MFR than the MFR targetted for the final product (see point 4.1 above).

It also added that the process of independent claim 9, and therefore the additional processes defined in the claims which are dependent on claim 9 require the use of a visbreaking step, in line with the general teaching provided in the specification (see above point 4.1). Moreover, the fact that dependent claim 2 defines a heterophasic propylene copolymer comprising a visbreaking step step does not imply that the product of independent claim 1 which covers at least that of claim 2 is necessarily meant to be obtainable by a process without such a visbreaking step. This is among other grounds because the double inequation set out in dependent claim 2 represents a preferred embodiment of the process using a visbreaking step, wherein the additional requirement concerning the double inequation serves as a guidance for preparing the claimed product.

5. In view of the foregoing, the Board concludes that the invention in accordance with the main request (patent as granted) has not been shown to be insufficiently disclosed within the meaning of Article 100 (b) EPC.

*Remittal (Article 111(1) EPC and Article 11 RPBA)*

6. The remaining grounds for opposition of lack of novelty and lack of an 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. In addition, considering that, under Article 12(2) RPBA, the primary object of the appeal proceedings is to review the decision under appeal in a judicial manner, the Board considers that the circumstances of case 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:

Beschwerdekammern des Europäischen Patentamts
Boards of Appeal of the European Patent Office
Chambres de recours de l'Office européen des brevets

D. Hampe D. Semino

Decision electronically authenticated