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# Datasheet for the decision of 24 November 2023

**Case Number:** T 1994/20 - 3.3.03

**Application Number:** 11008475.3

**Publication Number:** 2583998

**IPC:** C08L23/08

**Language of the proceedings:** EN

**Title of invention:**
Polyethylene composition with high rapid crack propagation resistance and pressure resistance

**Patent Proprietor:**
Borealis AG

**Opponent:**
Basell Polyolefine GmbH

**Relevant legal provisions:**
EPC Art. 56
RPBA 2020 Art. 11, 13(2)

**Keyword:**

Inventive step - all requests (no) - obvious alternative - experimental comparison not suitable to demonstrate an alleged effect in the context of the closest prior art
Amendment after summons - taken into account (no)
Remittal for examining inventive step of the auxiliary requests (no) - absence of special reason

**Decisions cited:**

T 0035/85

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**Beschwerdekammern**

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**Case Number: T 1994/20 - 3.3.03**

# D E C I S I O N
# of Technical Board of Appeal 3.3.03
# of 24 November 2023

| | |
|---|---|
| **Appellant:** (Opponent) | Basell Polyolefine GmbH<br>Brühler Strasse 60<br>50389 Wesseling (DE) |
| **Representative:** | LyondellBasell<br>c/o Basell Poliolefine Italia<br>Intellectual Property<br>P.le Donegani 12<br>44122 Ferrara (IT) |
| **Respondent:** (Patent Proprietor) | Borealis AG<br>Trabrennstrasse 6-8<br>1020 Vienna (AT) |
| **Representative:** | Kador & Partner Part mbB<br>Corneliusstraße 15<br>80469 München (DE) |
| **Decision under appeal:** | **Decision of the Opposition Division of the European Patent Office posted on 30 September 2020 rejecting the opposition filed against European patent No. 2583998 pursuant to Article 101(2) EPC.** |

**Composition of the Board:**

| | |
|---|---|
| **Chairman** | D. Semino |
| **Members:** | F. Rousseau |
| | R. Cramer |

## Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division rejecting the opposition against European patent No. 2 583 998.

II. The following items of evidence were submitted *inter alia* during the opposition proceedings:

D1: WO 2006/048257 A1
D3: WO 00/22040 A1.

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

(a) As regards inventive step, the closest prior art was represented by exemplified material D of D3 from which the polyethylene composition of granted claim 1 was distinguished by the $MFR_2$ value of the LMW (low molecular weight) fraction of the base resin being not more than 100 g/10 min.

(b) Considering that the comparative example of the patent in suit was a fair representation of the teaching of D3, it was found that the comparative test contained in the specification made it credible that the problem solved over the closest prior art was the provision of a polyethylene composition having improved rapid crack propagation resistance and slow crack growth resistance.

(c) Starting from D3, material D, the skilled person would not have found an incentive in any of the prior art documents cited to lower the $MFR_2$ of the

LMW fraction of the polyethylene composition to values of 100 g/10 min. or less in order to achieve an improvement of said properties.

(d) The claims as granted were therefore found to involve an inventive step.

IV. An appeal against that decision was lodged by the opponent (appellant).

V. In their response to the statement of grounds of appeal, the patent proprietor (respondent) filed three sets of claims as auxiliary requests 1 to 3 .

VI. Oral proceedings before the Board were held on 24 November 2023 by videoconference with the participation of both parties.

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

- The appellant requested that the decision under appeal be set aside and that the patent be revoked.

- The respondent requested that the appeal be dismissed, or alternatively that the case be remitted to the opposition division for further prosecution on the basis of the claims of one of auxiliary requests 1 to 3 filed with the reply to the statement of grounds of appeal.

VIII. Claim 1 of each of the requests underlying the present decision is as follows:

*Main request (patent as granted)*

"1. A polyethylene composition comprising a base resin which comprises

(A) a first ethylene homo- or copolymer fraction, and
(B) a second ethylene homo- or copolymer fraction,

wherein fraction (A) has a lower molecular weight than fraction (B), the molecular weight being determined by Gel Permeation Chromatography (GPC) according to ISO 16014-4:2003 and ASTM D 6474:1999,
fraction (A) has a $MFR_2$ of not more than 100 g/10 min., determined according to ISO 1133 at a loading of 2.16 kg and at 190 °C, and
the polyethylene compositions exhibit a viscosity at $eta_{747}$ of at least 400 kPa*s, determined at 190 °C and at conditions according to ISO 6721-10:1999."

*Auxiliary request 1*

Claim 1 of auxiliary request 1 corresponds to claim 1 of the main request in which the polyethylene composition is defined to be "bimodal".

*Auxiliary request 2*

Claim 1 of auxiliary request 2 corresponds to claim 1 of auxiliary request 1 in which the $MFR_2$ of fraction (A) is defined to be "of not more than 80 g/10 min".

*Auxiliary request 3*

Claim 1 of auxiliary request 3 corresponds to claim 1 of auxiliary request 2 in which the base resin is defined to have "a comonomer content of not more than 1

mol%, based on the total weight of the polyethylene composition, the comonomer content being determined by quantitative nuclear-magnetic resonance (NMR) spectroscopy as described herein".

IX. 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 point essentially concerned the question whether the claimed composition was inventive over the composition described with material D of D3, in particular whether an improvement of the pressure resistance in combination with improved impact properties could be acknowledged in view of the experimental results described in the patent in suit and in D3.

## Reasons for the Decision

*Main request - inventive step*

*Closest prior art*

1. It is an object of the invention to provide an improved polyolefin composition suitable for the production of a pressure pipe with improved pressure resistance as well as impact properties, especially rapid crack propagation resistance, while properties such as slow crack growth resistance, processability, tensile modulus, short term pressure resistance and sagging resistance are maintained at a high level (specification, paragraph [0009] in the light of paragraphs [0002], [0003], [0007] and [0008]).

1.1 D3 relates to pressure pipe multimodal polyethylene compositions. Material D obtained in example 3 (last paragraph of page 29 and tables 1 and 2 on pages 30 and 31) is described to have a high $eta_{747}$ value of 1070 (in line with the minimum value of 650 kPa.s defined in claim 1), i.e. good non-sagging properties, as well as excellent physical properties, such as resistance to slow crack propagation, a low $T_{crit}$ for rapid crack propagation and good impact strength at 0°C (page 1, lines 2-18; page 2, lines 7-16 and page 31, table 2 and lines 3-11).

1.2 The polyethylene composition of material D is prepared using (i) a prepolymerisation step in which an homopolymer of ethylene is prepared in a loop reactor with all the catalyst, (ii) a transfer of the prepolymer in a larger loop reactor for preparation of a low molecular weight (LMW) polyethylene homopolymer fraction in the presence of the prepolymer and (iii) preparation of a high molecular weight (HMW) fraction copolymer of ethylene and 1-hexene in a gas phase reactor in the presence of the LMW polyethylene fraction (page 28, line 26 to page 29, line 21). The prepolymer/LMW fraction/HMW fraction split, i.e. the relative amounts of prepolymer/LMW fraction/HMW fraction in the base resin prepared, is 2/43/55 (last line of table 1).

This corresponds to the most preferred method described in D3 (page 17, lines 5-14), according to which the polymerisation is carried out in a loop reactor/a gas-phase reactor, the polymerisation conditions being preferably so chosen that a comparatively low-molecular polymer having no content of comonomer is produced in one stage, preferably the first stage, owing to a high content of chain-transfer agent (hydrogen gas), whereas

a high-molecular polymer having a content of comonomer is produced in another stage, preferably the second stage.

1.3 The parties are in agreement that the skilled person, having regard to the goals defined in the patent in suit, could reasonably start from the teaching of D3, in particular that of material D. The Board has no reason to have a different view and takes this material as the closest prior art.

*Distinguishing feature*

2. The parties also agree that the composition of operative claim 1 differs from material D of D3 solely in that the first ethylene homo- or copolymer fraction (A) has a $MFR_2$ of not more than 100 g/10 min., whereas the first ethylene homopolymer fraction of material D has a $MFR_2$ of 1060 g/10 min.

*Determination and meaning of the $MFR_2$ of fraction (A)*

It is helpful at this juncture to stress how the melt flow rate $MFR_2$ of fraction (A) of the polyethylene composition of operative claim 1 is measured. This is not only defined in operative claim 1 by the indication of the norm ISO 1133, a loading of 2.16 kg and a temperature of 190 °C, but confirmed in paragraph [0075] concerning the experimental part of the specification.

It also pointed out that the inventive example of the patent in suit is prepared in a manner similar to that of material D of D3, namely (i) a prepolymerisation step in a loop reactor in which a homopolymer of ethylene is prepared, (ii) transfer of the prepolymer

in a larger loop reactor for preparation of a polyethylene homopolymer fraction in the presence of the prepolymer and (iii) preparation of a second fraction of higher molecular weight which is an ethylene copolymer in a gas phase reactor in the presence of the polyethylene fraction (paragraph [0102] to [0105]).

Under these circumstances, as pointed out by the appellant at the oral proceedings, it must be understood that the $MFR_2$ indicated for the inventive example of the patent in suit for the material produced in the loop polymerisation reactor corresponds to that of the product comprising the prepolymer and the polyethylene homopolymer prepared in the loop reactor. Accordingly, for a base resin prepared as described for the inventive example of the patent in suit, the $MFR_2$ value of fraction (A) defined in operative claim 1 must be understood to correspond to that of the mixture of the prepolymer and the first ethylene homo- or copolymer prepared in the loop reactor.

A different reading of claim 1 is not apparent from the specification. The respondent's argument that the $MFR_2$ of fraction (A) would correspond to the sole polyethylene homopolymer (i.e. without the prepolymer) and would be calculated on the basis of the equation developed by Hagström and co-workers indicated in paragraph [0040] is not persuasive, not only because it would be in contradiction with the unambiguous definition in claim 1 that the $MFR_2$ value of fraction (A) is measured, but also because no indication is provided in the experimental part of the specification about determination of the MFR of the prepolymer which would be required to compute the $MFR_2$ value of the sole polyethylene homopolymer.

Furthermore, paragraph [0040] of the specification is to be read in the light of paragraph [0039] in which it is indicated that a calculation of the MFR of the LMW ethylene polymer fraction (A) can be made in the case that the LMW is prepared in the second polymerisation step, i.e. in the presence of the HMW fraction (B). This applies as in this case a measurement of the $MFR_2$ of the LMW is not possible, since the LMW fraction is present in admixture with the HMW fraction, which situation does not correspond to that of the inventive example.

The same is valid for material D of D3 which is also prepared by transferring the prepolymer in a larger loop reactor for preparation of the LMW polyethylene homopolymer in the presence of the prepolymer (see point 1.2 above). In D3 the $MFR_2$ which is used for characterizing the material prepared in the loop reactor is also determined in the same manner as in the patent in suit (page 11, lines 26-35). The $MFR_2$ of 1060 g/10 min. indicated for the first ethylene homopolymer fraction of material D is therefore that of the product obtained after polymerisation in the loop reactor which comprises the prepolymer and the polyethylene homopolymer prepared in the loop reactor.

*Problem successfully solved*

3. Having regard to the disclosure of the closest prior art, the respondent and the appellant took differing positions as to which problem can be considered to be successfully solved by the subject-matter of operative claim 1.

Relying on the experimental results described in the specification and the properties of material D described in D3, the respondent submitted that the technical problem solved by the subject-matter of claim 1 with respect to the closest prior art was the provision of a polyolefin composition having improved pressure resistance, particularly regarding the slow crack growth (SCG) resistance, in combination with improved impact properties, especially rapid crack propagation resistance (RCP) (rejoinder, page 11, section 3.6 and page 17, section 3.17), while maintaining a good balance of the other properties.

This was disputed by the appellant who formulated the problem solved over the closest prior art as the provision of a further polyethylene composition for use in pressure pipes. In this respect the appellant submitted i.a. that a comparison between the properties of material D of D3 and those of the material according to the inventive example of the patent in suit could not demonstrate the effect resulting from the distinguishing feature, since those materials did not only differ in the $MFR_2$ value of the LMW fraction of the base resin, but additionally in the type of comonomer used for the HMW fraction, i.e. 1-hexene for the inventive example, instead of 1-butene for material D of D3.

3.1 Concerning the direct comparison of the performances of resin of the inventive example of the patent in suit and that of material D of D3, it was submitted by the respondent that the inventive example of the patent in suit was clearly superior in terms of RCP (- 14°C) and SCG resistance measured on notched pipes under a stress of 4.6 MPa at 80°C (3776/3195 hours) (patent in suit, paragraph [0099], table 3 on page 13 and paragraph

[0106]) when compared to material D of D3 exhibiting a RCP of -11°C and a SCG of 1881 hours (table 2 on page 31).

However, as pointed out by the appellant the materials compared by the respondent do not only differ in the $MFR_2$ value of the LMW fraction, but additionally among others in the use for their HMW fraction of a different comonomer, i.e. 1-hexene for material D of D3 (page 30, table 1) and 1-butene for the inventive example (page 12 and 13 of the specification, tables 1 and 2). Moreover, according to the same tables, the proportion of LMW fraction and HMW fraction comprising the comonomer is not the same for material D of D3 and that of the inventive example, as shown by the indication of a different split of the base resin. The split is 2/43/55 for material D of D3 and 2.9/53/44 for the material of the inventive example in the patent. These differences result in a substantial change of the density of the base resin, i.e. before compounding with the carbon black master batch, from 0,953 (D3, table 1, page 30, the density of the compounded resin being indicated in table 2 on page 31) to 0,948 (specification, page 13, table 2; paragraph [0103]).

The respondent submitted at the oral proceedings that according to their technical expert 1-hexene as comonomer would be known to lead to a higher SCG resistance than 1-butene, because 1-hexene would result in a higher degree of entanglement of the polymeric chains. On that basis, the comparison offered would rather more clearly demonstrate the alleged beneficial effect of using a first ethylene homo- or copolymer fraction (A) with a lower $MFR_2$ value of not more than 100 g/10 min.

That argument was not only put forward for the first time during the oral proceeding without any indication of exceptional circumstances justifying its lateness, and should for this reason not be taken into account in view of Article 13(2) RPBA, as was requested by the appellant, but is additionally not supported by any corroborating evidence. This argument, even if it were taken into account, remains therefore speculative and cannot convince. Accordingly, it cannot be agreed with the respondent that the sole significant modification between the material compared is the $MFR_2$ value of the LMW fraction.

Hence, the comparison between the properties of material D of D3 and those of the material of the inventive example of the patent suit offered by the respondent is not suitable to demonstrate a causal link between the distinguishing feature and the technical effects invoked by the respondent.

3.2 Concerning the additional comparison offered by the respondent, namely between the materials of the inventive example and of the comparative example shown in table 1 of the patent in suit, it is not disputed that those materials essentially differ from each other only in the $MFR_2$ of the LMW fraction, one with a value of 54 g/10 min., i.e. within the range of operative claim 1, and one exceeding 100 g/10 min., i.e. outside the range of claim 1. It is in this respect considered that the split used for the preparation of the two materials (2.9/53/44 for the inventive example vs. 2.8/52/45 for the comparative example) is essentially the same, slightly different proportions for the LMW and HMW fractions being likely due to rounding of the exact values. This comparison demonstrates that reducing the $MFR_2$ of the LMW fraction below a value of

100 g/10 min. brings about an increase of the short term pressure resistance and of the SCG resistance, accompanied with an improvement of the RCP resistance within the context of the comparative example of the patent in suit.

3.2.1 The respondent submits that the comparative example of the specification is a fair representation of materials A to D of D3, the reason being that the $MFR_2$ of the LMW fraction of the comparative example of the opposed patent is 522 g/10 min., lying between the lowest $MFR_2$ of 280 g/10 min. given for material A and the highest $MFR_2$ of 1060 g/10 min. given for material D of D3 (rejoinder, page 10, last sentence).

That argument rather concerns the question whether the $MFR_2$ of the LMW fraction of the comparative example of the opposed patent is representative of the $MFR_2$ of the LMW fraction used for materials A to D of D3, but not whether the composition of that comparative example is representative of material D of D3.

3.2.2 It results from the considerations under points 3.1 and 3.2 above that the material used in the comparative example of the specification differs in many aspects from the material of the closest prior art. The material of the comparative example of the specification differs from material D of D3, at least in terms of (i) the split (2.8/52/45 for the comparative example of the patent in suit vs. 2/43/55 for material D) and (ii) the use of a different comonomer for the HMW fraction and a different amount thereof in that fraction (expressed as the content in the whole material obtained of 0,43 mol% butene for the comparative example of the patent in suit vs. 0,34 mol% hexene for material D). This results in a difference of

density of the base resin, namely 0,949 for the comparative example of the patent in suit (page 13, table 2) and 0,953 for material D of D3. Accordingly, the comparative example of the patent in suit does not represent material D of D3, but a substantially modified version thereof.

This in itself does not invalidate the respondent's arguments based on the comparison made in the specification, since the possibility of using a comparison made with a variant of the closest prior art has been recognized by the Boards of Appeal as early as in T 35/85. According to point 4 of the Reasons for said decision the patentee may discharge his onus of proof by voluntarily submitting comparative tests with newly prepared variants of the closest state of the art making identical the features common with the invention in order to have a variant lying closer to the invention, so that the advantageous effect attributable to the distinguishing features of the invention is thereby more clearly demonstrated.

However, since the question to be answered concerns the problem successfully solved over the closest prior art by the claimed subject-matter, i.e. the result of the modification meant to be operated vis-à-vis that starting point to arrive at the claimed subject-matter, which modification is referred to in the case law as the distinguishing feature, it is *per se* not sufficient to demonstrate that an effect or advantage resulting from the distinguishing feature is observed in the context of a variant of the closest prior art used as reference example in the comparative test. It must additionally be credible that the same effect or advantage takes place in the context of the closest prior art, i.e. irrespective of the modification of the

closest prior art operated to prepare the reference example of the comparative test.

Concerning the present case, in the absence of any technical explanation for the technical effects resulting from the use of a LMW fraction having a lower $MFR_2$ of not more than 100 g/10 min. in the context of the comparative example of the patent in suit, there is no apparent reason to expect that the same effects are also obtained in the context of the closest prior art, which substantially differs therefrom.

Consequently, it follows from the above that the respondent has not presented any corroborating evidence or explanations rendering it credible that the purported technical effects of an improved pressure resistance, particularly regarding the SCG resistance, in combination with improved impact properties, especially RCP resistance, while maintaining a good balance of the other properties is actually achieved. Accordingly, any such advantage of the claimed polyethylene composition over the closest prior art cannot be taken into account for the purpose of assessing inventive step.

3.2.3 Thus, the problem underlying the claimed invention must be reformulated as the mere provision of a further polyethylene composition for use in pressure pipes.

*Obviousness of the solution*

4. It remains to be decided whether, in view of the disclosure of D3, and possibly in combination with other prior art documents or common general knowledge, the skilled person desiring to solve the above problem would have modified material D of D3 in such a way as

to arrive at the composition of operative claim 1. In this respect, it is the appellant's submission that the skilled person would have found it obvious in view of the teaching of D1 to use a LMW fraction whose $MFR_2$ is not more than 100 g/10 min., reference being made to page 10, lines 3-4 of that document.

4.1 D1 is also concerned with the production of multimodal polyethylene compositions for the production of pipes, pressure pipes being expressly mentioned (page 1, lines 6-16).

The multimodal compositions of D1 comprise a LMW ethylene homo- or copolymer fraction, a HMW ethylene homo- or copolymer fraction and a small amount of a ultra-high MW prepolymer ethylene homo- or copolymer fraction. The latter is produced when the catalyst is submitted to a prepolymerisation stage in slurry in a loop reactor, before said catalyst is transferred with the small amount of the prepolymer prepared to a larger loop reactor in which the LMW fraction is then produced in a slurry. The HMW fraction is prepared in a gas phase reactor in the presence of the LMW fraction transferred from the loop reactor (page 12, lines 6-22; page 13, lines 7-13; page 21, example).

In example 1 of D1, both the prepolymer and the LMW component are homopolymers of ethylene, while the HMW component is a copolymer of ethylene with butene. The split for example 1 of D1 is 2/48/50. The properties of the exemplified composition concern the homogeneity and its rheological properties, in particular an $eta_{747}$ of 675 kPas which in accordance with the general teaching of D1, according to which the $eta_{747}$ is more preferably 600 kPas or higher (claims 1 and 2, page 8, lines 19-21).

Concerning the $MFR_2$ values of the LMW fraction it is defined to be preferably of 10 g/10 min. or more, more preferably of 80 g/l0 min. or more (D1, page 10, lines 3-4). For example 1 of D1, the $MFR_2$ value of the product obtained in the loop reactor is of 103 g/10min.

It can be taken from the passage on page 9, lines 4 to 21 of D1 that the properties of the LMW and HMW fractions indicated for the example cannot be directly measured. They can either be inferred from polymers, which are separately produced in a single stage by applying identical polymerisation conditions, with regard to the stage of the multistage process in which the fraction is produced, and by using a catalyst on which no previously produced polymer is present, or be calculated in accordance with the work by B. Hagström, reference being made the same publication indicated in paragraph [0040] of the patent in suit.

Accordingly, a $MFR_2$ value of the product obtained in the loop reactor, i.e. the mixture of UHMW prepolymer and LMW fraction, will necessary be lower than the value for the LMW fraction. It follows from the values indicated on page 10, lines 2-4 of D1 that a fraction (A) within the meaning of operative claim 1 whose $MFR_2$ values are within the range of 10 g/10 min. to 80 g/l0 min. or even less is taught in D1.

4.2 Accordingly, faced with the problem of providing a further polyethylene composition for use in pressure pipes, the skilled person starting from material D of D3 and considering the general teaching of that document (see point 1.2 above) would have found it obvious to modify the molecular weight or the $MFR_2$ of the polymer produced in the loop reactor by varying the

content of chain-transfer agent (hydrogen gas). Such a variation for the preparation of the polymer produced in the loop reactor in a similar three-stage process is also taught on page 13, lines 20-22 of D1. As shown above, it follows from that document that such variations can lead to $MFR_2$ values for the mixture of prepolymer and product prepared in the loop reactor within the range from 10 g/10 min. to 80 g/l0 min. or even less. Considering the compatibility of the processes described in D3 and D1, the skilled person would therefore have found the suggestion to prepare a first ethylene homo- or copolymer fraction (A) within the meaning of operative claim 1 whose $MFR_2$ is within the range from 10 g/10 min. to 80 g/l0 min. or even less, arriving thereby in an obvious manner at polyethylene compositions falling within the ambit of claim 1 of the main request.

For the sake of completeness, it is added that the above reasoning equally applies if the $MFR_2$ of the LMW fraction is considered to the benefit of the respondent to be that of the material prepared in the loop reactor excluding the prepolymer, in which case D1 would still suggest to prepare a first ethylene homo- or copolymer fraction (A) whose $MFR_2$ is within the range from 10 g/ 10 min. to 80 g/l0 min.

4.3 Accordingly, the subject-matter of claim 1 of the main request which encompasses obvious embodiments does not meet the requirements of Article 56 EPC, and the ground for opposition under Article 100(a) EPC prejudices maintenance of the patent as granted.

*Request for remittal*

5. The respondent requested at the oral proceedings that the case be remitted to the opposition division for an assessment of the auxiliary requests.

The subject-matter of claim 1 of auxiliary request 1 differs from claim 1 of the main request in that the composition has been defined to be bimodal. Claim 1 of auxiliary request 2 has been further limited by defining the $MFR_2$ of fraction (A) to be not more than 80 g/10 min., instead of not more than 100 g/10 min. Auxiliary request 3 defines in addition the content of comonomer in the base resin.

It can be taken from the respondent's submissions in their rejoinder that the arguments concerning inventive step of the subject-matter of claim 1 as granted when starting from the disclosure of D3 applied *mutatis mutandis* to claim 1 of auxiliary requests 1 to 3. It was submitted in addition that D1 was completely remote since it expressly related to trimodal compositions whereas claim 1 of auxiliary requests 1 to 3 required bimodal compositions. On that basis it was submitted that the skilled person would not consult the teaching of D1 when starting from a bimodal composition as described in D3. As a result, the subject matter of claim 1 of auxiliary requests 1 to 3 would involve an inventive step. The respondent, however, acknowledged at the oral proceedings that the only substantial change compared with their submissions on inventive step provided for the main request concerned the range of values for the $MFR_2$ of fraction (A). This concerned only auxiliary requests 2 and 3.

In the Board's opinion, it followed from the submissions made in relation to the main request concerning the values of the $MFR_2$ of the LMW fraction taught in D1 and those concerning the modality of the resin, that an assessment of inventive step taking these additional features into account did not require further considerations beyond the question of obviousness of the solution. Having regard to the facts underlying the present case, this could not constitute a special reason within the meaning of Article 11 RPBA justifying a remittal of the case to the opposition division. The request for remittal was therefore refused.

*Auxiliary request 1*

6. The respondent accepted at the oral proceedings that the conclusion on inventive step regarding the main request would equally apply to auxiliary request 1. In this respect, the Board is of the view that the skilled person faced with the problem of providing a further polyethylene composition for use in pressure pipes, would not have been deterred from applying the teaching of D1 concerning the $MFR_2$ of the polymer produced in the loop reactor, even if D1 and in particular its example 1 concerned a trimodal composition due to the presence of a minor amount of the ultra-high MW prepolymer. Indeed, the process of D1 including the preparation of a prepolymer corresponded to the one of D3 (see points 1.2 and 4.1, above). Accordingly, the subject-matter of claim 1 of auxiliary request 1 also lacks an inventive step.

*Auxiliary request 2*

7. The respondent submitted at the oral proceedings that the submissions concerning the problem solved vis-à-vis material D of D3 on the basis of the experimental data invoked in respect of the main request would still be valid and that the teaching of D1 to use a LMW fraction having more preferably a $MFR_2$ of 80 g/10 min. or more would not have guided the skilled person to decrease the $MFR_2$ value of the LMW fraction of material D from 1060 g/10 min. to at most 80 g/10 min. The respondent additionally submitted that the problem of providing an alternative implied that a similar properties profile was achieved.

This is not convincing. Also for the composition of auxiliary request 2 the problem cannot be formulated as the provision of a composition exhibiting a similar properties profile as material D of D3, since for the same reasons as given in relation to the main request, the experimental evidence on file is not appropriate to demonstrate any technical effect related to the distinguishing feature in the context of the closest prior art, e.g. the achievement of similar properties. Accordingly, the amendment inserted in auxiliary 2 does not result in a different formulation of the problem solved over the closest prior art. Such a problem merely consists in the provision of a polyethylene composition that is different from the polyethylene composition of material D of D3, i.e. a further polyethylene composition for use in pressure pipes, as expressed in point 3.2.3 above, regardless of whether that composition is advantageous or not in comparison to that of material D of D3.

On that basis and taking into account that the skilled person would have found the suggestion in D1 to prepare an ethylene homo- or copolymer LMW fraction whose $MFR_2$ is within the range from 10 g/10 min. to 80 g/10 min., as indicated in points 4.1 and 4.2 above, it is concluded that the subject-matter of claim 1 of auxiliary request 2 is not inventive either.

*Auxiliary request 3*

8. Auxiliary request 3 specifies in addition the comonomer content to be limited to not more than 1 mol%, based on the total weight of the polyethylene composition. This amendment, however, does not introduce any additional distinguishing feature over the closest prior art and has no effect on the evaluation of inventive step. This was not disputed by the respondent which accepted at the oral proceedings that the conclusion on inventive step regarding the subject-matter of auxiliary request 2 equally applies to the one of auxiliary request 3.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

D. Hampe D. Semino

Decision electronically authenticated