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Datasheet for the decision of 7 March 2019

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Title of invention:
PHYSICAL BLENDS OF POLYETHYLENES

Patent Proprietor:
TOTAL RESEARCH & TECHNOLOGY FELUY

Opponent:
Borealis AG

Relevant legal provisions:
EPC Art. 56
RPBA Art. 13(1), 13(3), 12(4)

Keyword:

Admissibility of appeal - (yes)
Main request - Inventive step (no)
Second auxiliary request - Admitted (no)
Fourth auxiliary request - Inventive step (no)
Third auxiliary request - Admitted (no)

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Case Number: T 0778/16 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 7 March 2019

Appellant: (Patent Proprietor)	TOTAL RESEARCH & TECHNOLOGY FELUY Zone Industrielle C 7181 Seneffe (BE)
Representative:	Raboin, Jean-Christophe Total Research & Technology Feluy Zone Industrielle C 7181 Seneffe (BE)
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Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 25 January 2016 revoking European patent No. 1453911 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	D. Marquis
	W. Ungler

Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division posted on 25 January 1016 revoking European patent No. 1 453 911.

II. The decision of the opposition division to revoke European patent EP 1 453 911 was based on the claims as granted as the main request, on the first to eighth auxiliary requests filed with letter of 15 October 2015 and on the ninth auxiliary request filed during the oral proceedings before the opposition division on 15 December 2015.

Claim 1 of the main request read:

"1. A process for the preparation of polyethylene resins having a narrow molecular weight distribution that comprises essentially the steps of:

(i) providing a first metallocene-produced linear low density polyethylene (mLLDPE) resin having a density of from 0.920 to 0.940 g/cm^3 _a MI2 of from 0.05 to 2 g/10 min and a molecular weight distribution in the range of from 2 to 4.5;

(ii) providing a second high density polyethylene (HDPE) prepared either with a Ziegler-Natta or with a metallocenes catalyst, said polyethylene having a density ranging from 0.950 to 0.970 g/cm^3 and a MI2 of from 0.1 to 10 g/10 min;

(iii) physically blending together the first and second polyethylenes to form a polyethylene resin having a narrow molecular weight distribution, a density ranging from 0.930 to 0.955 g/cm^3 and a MI2 of from 0.5 to 8 g/

10 min

wherein the MI2 is measured according to ASTM D 1238 using a load of 2.16kg at a temperature of 190 °C and the density is measured at 23 °C according to ASTM D 1505."

Claim 2 of the first, second and third auxiliary requests were based on claim 1 of the main request and contained a disclaimer "with the proviso that a physically blended resin having a narrow molecular weight distribution, a density ranging from 0.940 to 0.955 g/cm^3 and a MI2 of from 0.5 to 3 g/10 min is excluded" (together with additional limitations in the second and third auxiliary requests). Claim 2 of the fourth auxiliary request, which pertained to injected fuel tanks, contained the same disclaimer.

Claim 1 of the fifth auxiliary request corresponded to claim 1 of the main request with the further limitations of the density from 0.940 to 0.955 g/cm^3 and of the MI2 of from 0.5 to 3 g/10 min (both for the polyethylene resin).

Claim 1 of the sixth auxiliary request corresponded to claim 1 of the fifth auxiliary request for which the range defining the density of the first metallocene-produced linear low density polyethylene (mLLDPE) resin was from 0.920 to 0.935 g/cm^3.

Claim 1 of the seventh auxiliary request corresponded to claim 1 of the sixth auxiliary request in which the polyethylene resin was a physical blend and comprised "from 20 to 80 wt% of the first metallocene-produced linear low density polyethylene and from 80 to 20 wt% of the second HDPE resin".

The eighth auxiliary request pertained to injected fuel tanks (claim 1), a cosmetic packaging (claim 7) and injected caps and closures (claim 13) produced with the polyethylene blends prepared according to a process corresponding to that of claim 1 of the fifth auxiliary request.

Claim 1 of the ninth auxiliary request corresponded to claim 1 of the eight auxiliary request.

III. The following documents inter alia were cited in the decision of the opposition division:

D3: WO 96/14358
D5: EP0783022

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

(a) D3 and in particular the fifth example of Table 1B and the example in the last column of Table 1A (referred hereunder as examples 5 and 7 of D3) represented the closest prior art for the main request. Claim 1 of that request differed from example 7 in a slightly higher value of melt index for the composition. Claim 1 differed from example 5 in a slightly higher density of the linear low density polyethylene component (LLDPE). Since it was not established that either of these distinguishing features of claim 1 had an effect over the closest prior art, the technical problem was the provision of a further process for the preparation of polyethylene moulding resins. Table 1A on page 17 of D3 showed that compositions

according to that document could exhibit a melt index within the claimed range. Regarding the density of the LLDPE component, D3 disclosed ranges that overlapped with the range defined in claim 1 of the main request. Also, it was not established that the metallocene catalyst used for the preparation of the LLDPE component conferred special characteristics or properties to the polyethylene resins prepared from the claimed process. In conclusion, the distinguishing features of claim 1 represented an arbitrary selection within the general teaching of D3 for which no inventive merit was acknowledged.

(b) Claim 2 of the first, second, third and fourth auxiliary requests contained a disclaimer defined by the relative and unclear wording "narrow molecular weigh distribution". None of these complied in view of this with the requirements of Article 84 EPC.

(c) The fifth, sixth and seventh auxiliary request failed to meet the requirements of Article 56 EPC for the same reasons as the main request since the subject matter claimed therein was not distinguished by any further feature over D3.

(d) D3 disclosed moulded bottles that fell under the wording "cosmetic packaging" defining the subject matter of claim 7 of the eighth auxiliary request. The problem of providing further moulded bottles was solved by an arbitrary selection within D3. That request too lacked an inventive step.

(e) Example 2 of D5 represented the closest prior art for the claims of the ninth auxiliary request. No

evidence was provided that showed an effect over D5. In particular, it was not established that the difference in melt index of the composition influenced the processability of the resin or the environmental stress crack resistance (ESCR) of the articles produced. The problem solved was thus the provision of further injection moulded articles. An increase of the melt index was already taught in D5. Therefore also that request lacked an inventive step.

V. The patent proprietor (appellant) lodged an appeal against that decision and submitted with the statement setting out the grounds of appeal a main request as well as first to seventh auxiliary requests and an additional example referred to as D11.

VI. In a communication sent in preparation of oral proceedings, the Board summarised the points to be dealt with and provided a preliminary view on the disputed issues.

VII. Oral proceedings were held on 7 March 2019 during which the appellant withdrew the first, third and fifth to seventh auxiliary requests submitted with the statement setting out the grounds of appeal. The requests maintained by the appellant at the oral proceedings before the Board were, in that order and using the numbering provided in the statement setting out the grounds of appeal:

The main request, which corresponded to the claims as granted.

The second auxiliary request in which claim 1 corresponded to claim 1 as granted wherein the range

defining the melt index (MI2) of the polyethylene resin was amended to 3 to 8 g/10 min.

The fourth auxiliary request in which claim 1 related to injected fuel tanks produced with the polyethylene blends prepared according to claim 1 as granted.

A new third auxiliary request was submitted during oral proceedings to be dealt with as the last request. Claim 1 of that request corresponded to claim 1 as granted in which the ranges defining the density and the melt index (MI2) of the first metallocene-produced linear low density polyethylene (mLLDPE) resin were from 0.926 to 0.934 g/cm^3 and from 3 to 1.6 g/10 min respectively, the density of the second high density polyethylene (HDPE) prepared either with a Ziegler-Natta or with a metallocene catalyst was 0.96 g/cm^3 and the range defining its MI2 was from 1.03 to 2.9 g/10 min and the ranges defining the density and the MI2 of the polyethylene resin having a narrow molecular weight distribution obtained by physically blending together the first and second polyethylenes were from 0.942 to 0.950 g/cm^3 and from 0.8 to 1.9 g/10 min respectively.

VIII. The arguments provided by the appellant, as far as relevant to the present decision, can be summarised as follows:

Admissibility of the appeal

(a) No arguments were provided by the appellant in that regard.

Main request

Inventive step

(b) D3 represented the closest prior art for the main request. Claim 1 of the main request differed from the process disclosed in example 5 of D3 in the density of the linear low density polyethylene component (LLDPE).

(c) The examples of the patent in suit showed that the problem solved over D3 was the provision of a process for the preparation of polyethylene resins with improved mechanical properties, in particular environmental stress crack resistance (ESCR), processability, gloss and reduced warping.

(d) While D3 disclosed a broad range of densities for the LLDPE component (B) that overlapped with the range according to claim 1 of the main request, the skilled person would not have considered working in the area of overlap as the teaching of D3 was to use a LLDPE with a density lower than 0.91 g/cm^3. There was thus no motivation in D3 to raise the density of the LLDPE component of the composition of example 5 to solve the problem posed.

(e) Moreover, there was no mention of reduced warping in D3. Also, since it was generally known that a higher difference between the densities of the LLDPE component and of the HDPE component led to reduced warping, the skilled person of D3 would not have been motivated to go against that general teaching and raise the density of the LLDPE component to reduce warping in the polyethylene

resins.

(f) There was furthermore no pointer in D3 towards the claimed process as the patent in suit and D3 concerned different applications of the polyethylene resins, the patent in suit pertaining to glossy bottles and cosmetic packagings while D3 concerned cans for chemicals.

(g) Claim 1 of the main request therefore involved an inventive step.

Second auxiliary request

Admittance

(h) The second auxiliary request was filed in response to the decision of the opposition division. Although the amendment of the melt index in claim 1 excluded the examples of the patent in suit, an additional example was provided with the statement setting out the grounds of appeal that showed the workability of the process. The second auxiliary request should be admitted into the proceedings.

Fourth auxiliary request

Inventive step

(i) D5 represented the closest prior art. Claim 1 of the fourth auxiliary request differed from example 2 of D5 in the molecular weight distribution and the melt index of the LLDPE component.

(j) The patent in suit did not show that the molecular weight distribution of the LLDPE component had a

particular technical contribution. Also, starting from D5, a person skilled in the art would have considered working in the range of 2 to 4.5 according to claim 1 of the fourth auxiliary request.

(k) Moreover, the melt index of the LLDPE component resulted in an improved environmental stress crack resistance (ESCR) as derivable from a comparison of the examples according to D5 and according to the patent in suit. The patent in suit additionally showed that the claimed subject matter was characterized by an improved balance of ESCR, warping and processability.

(l) Although the range of melt index of the LLDPE component disclosed in D5 encompassed the range according to claim 1 of the fourth auxiliary request, the skilled person would not have worked in the claimed range since the teaching of D5 was to use low values of melt index, in particular lower than 0.01 g/10 min as derivable from its examples.

(m) Also, D5 did not contain a teaching that was specific to injection moulding since that application was only addressed at the very beginning of D5, among other applications. There was thus no motivation for the skilled person to adjust the melt index of the LLDPE component to improve the properties of injection moulded parts.

(n) Claim 1 of the fourth auxiliary request therefore involved an inventive step.

Third auxiliary request

Admittance

(o) The third auxiliary request addressed an objection raised by the respondent in their reply to the statement setting out the grounds of appeal. The amendments performed in that respect were based on the examples of the patent in suit. It was always the intention of the appellant to base the definition of claim 1 of the third auxiliary request on ranges derived from the examples of the patent in suit. That request was not filed prior to the oral proceedings before the Board because the appellant did not know whether the request would have been admitted by the Board. On this basis, the third auxiliary request should be admitted into the proceedings.

IX. The arguments of the opponent (respondent), as far as relevant to the present decision, can be summarised as follows:

Admissibility of the appeal

(a) The opposition division concluded in the decision under appeal that the claims of the main request and of the first to eighth auxiliary requests lacked inventive step over examples 5 and 7 of the closest prior art document D3. The decision of the opposition division with respect to these requests was not challenged in the statement setting out the grounds of appeal since the arguments provided by the appellant on inventive step did not address the two examples relied upon by the opposition division. The appeal was thus deficient in that

respect and hence inadmissible.

Main request

Inventive step

(b) Example 5 of D3 represented the closest prior art. Claim 1 of the main request differed from that example in a slightly higher density of the LLDPE component.

(c) The examples of the patent in suit did not show an improvement of any property over D3 as it was not established that raising the density of the LLDPE component to the range according to claim 1 of the main request resulted in any effect. Thus, in the absence of comparative examples with D3, the problem had to be formulated as the provision of a further process for the preparation of polyethylene resins.

(d) D3 already provided the general teaching that the density of the LLDPE component could be varied within a range that overlapped with the range according to claim 1 of the main request. Moreover, D3 did address warping, albeit indirectly, as rigidity of the resins was mentioned. D3 also disclosed in claim 12 a wide range of applications including bottles. Since the use of bottles was not further detailed in D3, it was fair to assume that these bottles were generally applicable to cosmetic applications.

(e) Claim 1 of the main request thus lacked an inventive merit over D3.

Second auxiliary request

Admittance

(f) The subject matter of the second auxiliary request had not been present in the first instance opposition proceedings. In particular, the limitation of the melt index in claim 1 which excluded all the examples of the patent in suit constituted a significant change of case in the appeal proceedings. The second auxiliary request therefore represented a fresh case and should not be admitted into the proceedings.

Fourth auxiliary request

Inventive step

(g) D5, and in particular its example 2, represented the closest prior art for the fourth auxiliary request. Claim 1 of that request differed from example 2 of D5 in the molecular weight distribution and the melt index of the LLDPE component.

(h) The examples of the patent in suit did not establish the presence of an improvement resulting from the selection of any of these two distinguishing features. The good balance of properties alleged by the appellant was already achieved in D5. As to warping, the data available in the patent in suit did not show an improvement. It was also apparent from D5 as a whole that its teaching was valid for any moulding application mentioned in its introduction and therefore also

for injection moulding.

(i) The data missing in D5 regarding the concentration of the deteriorating agent used in the determination of the ESCR did not allow a direct comparison of the composition of example 2 of that document with the examples of the patent in suit for which a concentration of 10% and 100% was used. It was thus not possible to conclude that the choice of melt index in the range according to claim 1 of the fourth auxiliary request led to an improvement of the ESCR.

(j) The problem solved in view of example 2 of D5 was the provision of further injected fuel tanks.

(k) Since D5 taught a range of melt index of LLDPE component that encompassed the one of claim 1 of the fourth auxiliary request, the skilled person would have expected that the problem posed was also solved for any melt index within that range. Claim 1 of the fourth auxiliary request lacked therefore an inventive step over D5.

Third auxiliary request

Admittance

(l) The amendments performed in claim 1 of the new version of the third auxiliary request were meant to address an objection that was raised in the reply to the statement setting out the grounds of appeal. The third auxiliary request therefore could and should have been provided as early as possible after the reply to the statement setting out the grounds of appeal and not on the day of the oral

proceedings before the Board.

(m) The amendments performed in claim 1 of that request broadened the ranges defining the density of the high density polyethylene (HDPE) and that of the composition. That broadening, since it modified the number of relevant examples of the patent in suit to be considered for the discussion of inventive step, changed the case of the appellant at the latest stage possible of the proceedings. For these reasons, the third auxiliary request should not be admitted into the proceedings.

X. The appellant requested that the decision under appeal be set aside and the patent be maintained as granted (main request), in the alternative that the patent be maintained in amended form on the basis of the claims of one of the second and fourth auxiliary requests filed with the statement setting out the grounds of appeal, or on the basis of the claims of the third auxiliary request filed during the oral proceedings of 7 March 2019.

XI. The respondent requested that the appeal be rejected as inadmissible or in the alternative that the appeal be dismissed. Furthermore, it requested that the second and third auxiliary requests not be admitted into the proceedings.

Reasons for the Decision

1. Admissibility of the appeal

1.1 The statement of grounds of appeal against the decision of the opposition division was based on a main request,

which corresponded to the main request found to lack inventive step in view of document D3, new first to fifth auxiliary requests, a sixth auxiliary request corresponding to the fifth auxiliary request in opposition and a seventh auxiliary requests which corresponded to the ninth auxiliary request found to lack inventive step in view of document D5.

1.2 With respect to the seventh auxiliary request more particularly, the statement setting out the grounds of appeal contained a substantiated reasoning as to why the decision of the opposition division on inventive step in view of D5 as closest prior art should be reversed (point 5.7.2 referring to point 5.4.3 in the statement setting out the grounds of appeal). That was not contested by the respondent.

1.3 Having regard to the arguments provided by the appellant about inventive step of the seventh auxiliary request which addressed the decision of the opposition division against the corresponding ninth auxiliary request, the Boards finds that the statement setting out the grounds of appeal fulfilled the requirements for the admissibility of the appeal, as set out under Article 108, third sentence EPC, together with Rule 99(2) EPC.

1.4 It is the established case law of the Boards of Appeal that the admissibility of an appeal can only be assessed as a whole, such that it is sufficient for an appeal to be admissible that the requirements for its admissibility are fulfilled at least in respect of one request (Case Law of the Boards of Appeal, 8th Edition, July 2016, IV.E.2.6.9). Whether or not the statement setting out the grounds of appeal adequately addressed the reasoning of the contested decision with respect to

the main request or any of the other first to sixth auxiliary requests is thus immaterial to the admissibility of the present appeal.

1.5 The Board concludes from the above that the appeal is admissible.

Main request

2. Inventive step

2.1 The patent in suit relates to the production and use of polyethylene resins produced by physical blends of polyethylenes (paragraph 1). More particularly, the object of the patent in suit is to produce polyethylene resins with improved stress crack resistance, improved optical properties and presenting negligible warping when used in injection moulded parts (paragraphs 14 to 16).

2.2 Document D3 was considered as the closest prior art in the contested decision of the opposition division. D3 concerns molding compositions resulting from a blend of a high density ethylene homopolymer or interpolymer and a low density ethylene interpolymer (page 1, lines 5 and 6) and addresses the optical properties (gloss) and stress crack resistance of these compositions (page 9, lines 30-35). Although D3 does not specifically address warping, that document was nevertheless seen by both parties as the document representing the closest prior art for the main request. The Board finds no reason to deviate from document D3 as closest prior art.

2.3 Within D3, the composition according to example 5 in table 1B (page 18, sixth column) was seen as particularly relevant and it was acknowledged by both

parties that the sole feature distinguishing the subject matter according to claim 1 of the main request from the polyethylene composition according to example 5 of D3 was the density of the LLDPE component, comprised in the range of 0.920 to 0.940 g/cm^3 in claim 1 of the main request and having a value of 0.919 g/cm^3 in the composition of example 5 of D3. With respect to that distinguishing feature, the question that the Board had to answer was whether the patent in suit showed an improvement with respect to the closest prior art.

2.4 The examples of the patent in suit describe the preparation of polyethylene resins having narrow molecular weight distributions according to the process of claim 1 of the main request (Table 3). The LLDPE components that were used in that process are shown in Table 1 (MLL1 to MLL6). The values of the density of these LLDPE resins are all within the claimed range of 0.920 to 0.940 g/cm^3, the lowest value being 0.927 g/cm^3 (MLL5) and the highest value being 0.934 g/cm^3, from which it is apparent that none of the compositions provided in the patent in suit contains a LLDPE resin having a density outside the range according to claim 1 of the main request. In that regard, none of the compositions described in the examples of the patent in suit corresponds to the composition according to example 5 of D3, in which the density of the LLDPE component is just below the range according to claim 1 of the main request. The examples of the patent in suit therefore cannot establish the criticality of the range defining the density of the LLDPE component according to claim 1 of the main request.

2.5 The appellant however contended that the patent in suit showed an improvement of the environmental stress crack

resistance (ESCR) of the polyethylene compositions. That property is addressed in paragraphs 91 and 92 of the description of the patent in suit in which the test for the measurement of the ESCR is described and a reference is made to figures 4 and 6 for data allegedly showing an improvement of the ESCR for various blends as a function of their density of the LLDPE component. The description of the patent in suit however does not establish the criticality of using a LLDPE component having a density above 0.920 g/cm^3 as defined in claim 1 of the main request for the improvement of stress crack resistance. Figures 4 and 6 of the patent in suit do report results of ESCR measurements but these results do not provide a comparison with compositions containing a LLDPE component having a density outside the range according to claim 1 of the main request such that it cannot be deduced therefrom that the ESCR of the compositions according to to the patent in suit were effectively improved by comparison to the compositions of the closest prior art.

2.6 Also with regard to the alleged reduced warping, improved gloss and tensile properties, the patent in suit, and in particular the relevant passages in paragraph 93, 94 and 95 describing these properties, do not address the criticality of having a density of the LLDPE component in the range of from 0.920 g/cm^3 to 0.940 g/cm^3 as defined in claim 1 of the main request.

2.7 Thus, the Board finds that the improvement of the ESCR, the processability, the gloss and reduced warping of the compositions that was alleged by the appellant over D3 was not established on the basis of the information contained in the patent in suit. As a result that alleged improvement cannot be used in the formulation of the technical problem solved over the closest prior

art. Under these circumstances, the problem that can be formulated over D3 is the provision of a further process for the preparation of polyethylene resins having a narrow molecular weight distribution.

2.8 It remains to be analysed whether the proposed solution to the problem of providing a further process for the preparation of polyethylene resins having a narrow molecular weight distribution, namely the choice of a LLDPE component having a density in the range of 0.920 to 0.940 g/cm^3 according to claim 1 of the main request was obvious in view of the available prior art.

2.9 The LLDPE component used in the composition of example 5 of D3 has a density of 0.919 g/cm^3, which is just below the range according to claim 1 of the main request. The skilled person however learns in D3 that the density of the LLDPE components in the polyethylene compositions can be more broadly selected within the range of 0.85 to 0.93 g/cm^3 and additionally that the density of 0.920 g/cm^3, which defines the lower part of the range according to claim 1 of the main request, belongs to a preferred range when it comes to moulded articles exhibiting a good combination of gloss, impact resistance and stress cracking resistance (page 9, lines 25 to 38).

2.10 In view of that teaching, the skilled person, starting from D3 and aiming at solving the posed problem, would consider LLDPE components having a density in the range of 0.85 to 0.93 g/cm^3 and therefore also in the range of overlap with claim 1 of the main request (0.920 to 0.93 g/cm^3), as obvious solutions. The skilled person would thus arrive at the process of claim 1 of the main request in an obvious manner.

2.11 While the passages on page 9, lines 25 to 38, page 7, lines 32 to 38 and page 12, lines 9 to 12 of D3 teach narrower ranges of the density of the LLDPE component that are outside the range according to claim 1 of the main request, none of these passages can be seen as actually teaching away from the broader range of 0.85 to 0.93 g/cm^3 which already constitutes a satisfactory solution to the problem of providing a further process for the preparation of polyethylene resins having a narrow molecular weight distribution.

2.12 Therefore the process of claim 1 of the main request does not involve an inventive step.

2.13 Objections of lack of sufficiency of disclosure and lack of novelty had also been made against the main request in the reply to the statement setting out the grounds of appeal. Moreover, in view of the negative conclusion reached on inventive step for the main request, there is no need for the Board to decide on these objections.

Second auxiliary request

3. Admittance

3.1 The second auxiliary request was first filed with the statement setting out the grounds of appeal. It is based on the main request and additionally limits the range defining the melt index MI2 of the polyethylene resins in step (iii) of the process according to claim 1 by amending the range from 0.5 to 8 g/10 min to the range from 3 to 8 g/10 min.

3.2 That limitation of the melt index MI2 to the upper part of the range disclosed in claim 1 of the main request

not only contrasts with the preferred range disclosed throughout the patent in suit (0.5 to 3 g/10 min in paragraphs 19, 20 and 25), but it also excludes the blends of the examples in the patent as these all have a melt index MI2 comprised between 0.8 and 1.9 g/10 min (Table 3). In that respect, the limitation performed in claim 1 of the second auxiliary request constitutes a shift in subject matter as compared to the main request.

3.3 The second auxiliary request also constitutes a change of case in appeal since the discussion of inventive step before the opposition division was based on a different range (0.5 to 3 g/10 min) instead of the range of to 3 to 8 g/10 min now relied upon by the appellant (statement setting out the grounds of appeal point 5.2.4). This is also apparent from the additional example D11 provided by the appellant with the statement setting out the grounds of appeal alleging an effect resulting from the limitation, an improved processability in combination with an improved stress crack resistance, which is as such not disclosed in the patent in suit.

3.4 Under these circumstances, the Board concludes that the the second auxiliary request submitted by the appellant in appeal into the proceedings would constitute a fresh case. Moreover, no justification for the change of strategy can be recognised, as none was even alleged by the appellant. Under these conditions, the Board finds that, if the appellant intended to defend the patent with such a limitation, it should have done so in opposition proceedings. On this basis, the Board finds it appropriate to exercise its discretion under Article 12(4) RPBA by not admitting the second auxiliary request into the proceedings.

Fourth auxiliary request

4. Inventive step

4.1 Claim 1 of the fourth auxiliary request pertains to injected fuel tanks produced with polyethylene blends prepared according to the process corresponding to claim 1 of the main request.

4.2 The parties considered that two features distinguished the subject matter according to claim 1 of the fourth auxiliary request from example 2 of D5 which was seen as the closest prior art, namely the molecular weight distribution and the melt index of the LLDPE component. The Board has no reason to take a different approach.

4.3 With regard to the molecular weight distribution of the LLDPE component, the appellant acknowledged that the range of 2 to 4.5 as defined in claim 1 of the fourth auxiliary request was not causally linked to any particular effect in the patent in suit.

4.4 With regard to the melt index of the LLDPE component, it is apparent that none of the examples provided in the patent in suit, and in particular none of the LLDPE components shown in Table 1 (MLL1 to MLL6) has a melt index outside the range according to claim 1 of the fourth auxiliary request. As a result, none of the examples of the patent in suit can actually be seen to represent the ethylene polymer (B) of example 2 of D5. There is thus no example in the patent in suit that could establish that any effect observed on the properties reported in tables 4 to 7 or in figures 1 to 7 relating of the patent in suit can be attributed to the melt index distinguishing the claimed subject

matter from that of example 2 of D5. There is also no indication in the whole description of the patent in suit that the melt index of the LLDPE component in the polyethylene resins has a technical effect on the produced injected fuel tanks.

4.5 It was however argued by the appellant that a significant improvement of the ESCR resulting from the difference in melt index of the LLDPE component could be deduced by directly comparing the ESCR measurements in D5 and in the patent in suit. However, while the ESCR measurements appear to have been based on the same general ASTM method in the patent in suit and in D5, the polyethylene resins prepared in the patent in suit and in D5 upon which the appellant relied to establish an effect do not solely differ from one another in the melt index of the LLDPE component, they also differ significantly in value of the melt index of the HDPE component (from 1.0 to 50.0 g/10 min in Table 1 of D5; from 1.03 to 2.9 in Table 2 of the patent in suit) and also in the ratio of HDPE to LLDPE components in the polyethylene resins (70/30 or 60/40 in Table 1 of D5; from 50/50 to 60.2/39.8 in Table 3 of the patent in suit). Furthermore, the LLDPE and HDPE components of the polyethylene resins of the patent in suit and of D5 were prepared in the presence of different catalyst systems from which it cannot be simply assumed that they will result in comparable polyethylenes (catalysts (a) to (d) on pages 12 and 13 of D5; ethylene bis(4,5,6,7-tetrahydro-1-indenyl)zirconium dichloride (THI) and bis(n-butyl-cyclopentadienyl)zirconium dichloride (n-butyl) in Table 1 of the patent in suit). Under these circumstances, a comparison of ESCR values that were measured on samples obtained from these different polyethylene resins in the patent in suit and in D5 cannot be reasonably attributed to the difference

in melt index of the LLDPE resin only.

4.6 Besides, the specific conditions under which the ESCR was measured in D5 and in particular the concentration of the solution of deteriorating agent contacted with the polymer sample before measurement, remains unknown. The concentration of that agent has however a significant influence on the value of ESCR measured on the polymer sample as acknowledged on page 10, lines 35 to 37 of the patent in suit and as shown in figure 4 in the case of the blend B5. In particular that blend in figure 4 shows an ESCR of 300h when the concentration of the solution was 10% and 600h when the concentration of the solution was 100%. Since the concentration of that solution is unknown in D5, it cannot be concluded that the higher values of ESCR measured in the patent in suit as compared to D5 (30h in example 2) can only be attributed to the higher value of melt index of the LLDPE component since it could equally result from a difference in the concentration of the deteriorating solution used in the ESCR measurement. The Board thus concludes that a direct comparison of the ESCR measurements between the patent in suit and D5 is not suitable to show the presence of an improvement due to the melt index of the LLDPE component.

4.7 In the absence of any other evidence that the distinguishing features of the claim 1 of the fourth auxiliary request effectively result in an improved balance of environmental stress cracking resistance (ESCR), warping and processability as alleged by the appellant, the problem solved by the subject matter of claim 1 of the fourth auxiliary request in view of example 2 of D5 can only be seen as the provision of further injected fuel tanks.

4.8 It remains to be analysed whether the proposed solution to that problem, namely the use of a LLDPE component with a molecular weight distribution of 2 to 4.5 and a melt index of 0.05 to 2 g/10 min was obvious in view of the available prior art.

4.9 With regard to the molecular weight distribution, the appellant acknowledged that starting from example 2 of D5, a skilled person would have eventually considered using an ethylene polymer (A) having a molecular weight distribution as defined in claim 1 of the fourth auxiliary request as that constituted an usual range. That was also agreed by the respondent. The Board has no reason to deviate from that conclusion.

4.10 With regard to the melt index however, the appellant argued that the teaching of document D5 would have led the skilled person away from the range of 0.05 to 2 g/10 min as defined in claim 1 of the fourth auxiliary request. The Board finds however that there is no such teaching in D5. Indeed, the melt index of the ethylene polymers (B) is only addressed in a sentence on page 4, line 53 for which a range of from 0.0003 g/10 min to 35 g/10 min is disclosed. That range is arguably broad when compared to that defining claim 1 of the fourth auxiliary request (0.05 to 2 g/10 min) but there is no teaching in D5, nor was it shown by the appellant, that the skilled reader of D5 would have had any reason to restrict that range of melt index values when he intended to prepare injected fuel tanks as defined in claim 1 of the fourth auxiliary request. There is also no reason to assume that the preferred range of intrinsic viscosity disclosed on page 4, line 54 of D5, which the appellant found to correspond to a range below the value of 0.01 g/10 min on the basis of the examples, would have been the range of melt index

corresponding to applications relating to injection moulding specifically. On the contrary, the fact that the description of D5 discloses a broad range of melt index for the ethylene polymer (B) and also remains unspecific as to the melt index corresponding to moulding applications rather suggests that the whole range of melt index may be assumed to be adapted for injection moulding.

4.11 As to the examples of D5 (Table 1), the correlation between the values of melt index (MFR) of the ethylene polymer (B) and the values of ESCR alleged by the appellant to establish the presence of a teaching away from the range according to claim 1 of the fourth auxiliary request fails to convince since the polyethylene resins of these examples do not only differ in the melt index of their ethylene polymers (B), they also differ partly in the melt index of their ethylene polymers (A), their ratio of ethylene polymers (A) and (B) and in the polymerization method used to prepare the polyethylene resins (sequential polymerization in examples 1 and 2 and successive polymerization in examples 3 and 4). Thus, any variation of the ESCR measured on the compositions of these examples cannot be solely attributed to the melt index of the ethylene polymer (B) since it could also originate from any of these other differences. Under these circumstances, it cannot be concluded that the examples of D5 teach away from any part of the range of melt index of the ethylene polymer (B) as disclosed on page 4, line 53 in D5.

4.12 In the absence of any teaching to the contrary, the Boards finds that starting from the composition of example 2 of D5 and considering the general disclosure regarding the range of melt index for the ethylene

polymer (B) (0.0003 g/10 min to 35 g/10 min), the skilled person would have considered the compositions according to claim 1 of the fourth auxiliary request in which the melt index of the first metallocene-produced linear low density polyethylene (mLLDPE) is from 0.05 to 2 g/10 min, as solutions to the problem of providing further injected fuel tanks.

4.13 Therefore the subject matter of claim 1 of the fourth auxiliary request does not involve an inventive step.

Third auxiliary request

5. Admittance

5.1 The third auxiliary request that was provided at the oral proceedings before the Board essentially corresponds to the third auxiliary request provided with the statement of grounds of appeal but for which the value of 0.960 g/cm^3 defining the density of the second high density polyethylene (HDPE) in step (ii) of the claimed process was amended to 0.96 g/cm^3 and the value of 0.946 g/cm^3 defining the minimum of the range of density of the composition in step (iii) was amended to read 0.942 g/cm^3.

5.2 The reason given by the appellant for the filing of the third auxiliary request was to remedy an objection under Article 123(2) EPC made by the respondent in their reply to the statement setting out the grounds of appeal (point 69) against the version of that request filed with the statement setting out the grounds of appeal. The new version of the third auxiliary request was, according to the appellant, only filed on the day of the oral proceedings before the Board because the appellant did not known whether the previous request

would have been admitted.

5.3 The Rules of Proceedings of the Boards of Appeal however set out that any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion (Article 13(1) RPBA) and that amendments sought to be made after oral proceedings have been arranged shall not be admitted if they raise issues which the Board or the other party or parties cannot reasonably be expected to deal with without adjournment of the oral proceedings (Article 13(3) RPBA).

5.4 In the present case, the appellant should have filed the new version of their third auxiliary request in writing before the oral proceedings as a response to the objection made by the respondent in their reply to the statement setting out the grounds of appeal if it intended to defend the patent in this form. The appellant chose not to file that request, not even with their written submission in preparation to the oral proceedings provided on 7 February 2019.

5.5 By comparison with the previous version of the third auxiliary request, claim 1 of the new request is amended in that it broadens two ranges defining the density of the second high density polyethylene (HDPE) and that of the composition respectively. That changes the situation at least as far as the requirements of Article 123(2) EPC are concerned and also as far as to the debate relating to inventive step is concerned, since the newly filed amendments, in the own admission of the appellant, were meant to encompass more of the examples of the patent in suit than was the case with the previous version of the third auxiliary request. Since that is a significant change in the case of the

appellant which raises new issues, the Board considers that the new third auxiliary request should have been filed before the day of the oral proceedings, as it raises at that stage issues which the Board or the respondent could not reasonably have been expected to deal with without adjournment of the oral proceedings.

5.6 The third auxiliary request is thus not admitted into the proceedings (Article 13(3) RPBA).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. ter Heijden D. Semino

Decision electronically authenticated