Internal distribution code:

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

Datasheet for the decision of 10 July 2018

Case Number:	T 0756/15 - 3.3.03
Application Number:	07863496.1
Publication Number:	2052026
IPC:	C08L23/08, C08F255/02, C08F2/34, C08F297/00
Language of the proceedings:	EN

Title of invention:

HIGH-DENSITY POLYETHYLENE COMPOSITIONS, METHOD OF MAKING THE SAME, INJECTION MOLDED ARTICLES MADE THEREFROM, AND METHOD OF MAKING SUCH ARTICLES

Patent Proprietor:

Dow Global Technologies LLC

Opponents:

Ineos Sales (UK) Limited
Total Research & Technology Feluy

Relevant legal provisions:

EPC Art. 54(2), 56, 107, 108
RPBA Art. 13(3)
EPC R. 101(2), 139

Keyword:

Admissiblity of the appeal of opponent 1 (no)
Main request - novelty (no)
Auxiliary request 1 - inventive step (no) - obvious alternative
Auxiliary requests 4 and 5 - novelty (no) - burden of proof not shifted to the opponents
Auxiliary request 6 - inventive step (yes) - unexpected improvement - new objection of inventive step at the end of oral proceedings (not admitted)

Decisions cited:

G 0001/12, T 0035/85, T 0197/86, T 0939/92, T 0063/06, T 0518/10

Beschwerdekammern

Boards of Appeal

Chambres de recours

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

Case Number: T 0756/15 - 3.3.03

DECISION
of Technical Board of Appeal 3.3.03
of 10 July 2018

Appellant:
(Patent Proprietor)

Dow Global Technologies LLC
2040 Dow Center
Midland, MI 48674 (US)

Representative:

Boult Wade Tennant LLP
Verulam Gardens
70 Gray's Inn Road
London WC1X 8BT (GB)

Party as of right:
(Opponent 1)

Ineos Sales (UK) Limited
Hawkslease Chapel Lane
Lyndhurst
Hampshire SO43 7FG (GB)

Representative:

Smith, Julian Philip Howard
Mathisen & Macara LLP
Communications House
South Street
Staines-upon-Thames, Middx TW18 4PR (GB)

Appellant:
(Opponent 2)

Total Research & Technology Feluy
Zone Industrielle C
7181 Seneffe (BE)

Representative:

Cabinet Chaillot
16/20, avenue de l'Agent Sarre
B.P. 74
92703 Colombes Cedex (FR)

Decision under appeal:

Interlocutory decision of the Opposition Division of the European Patent Office posted on 11 February 2015 concerning maintenance of the European Patent No. 2052026 in amended form.

Composition of the Board:

Chairman	D. Semino
Members:	F. Rousseau
	R. Cramer

Summary of Facts and Submissions

I. Three notices of opposition were filed against European patent No. 2 052 026. In the course of the opposition proceedings opponent 3 withdrew its opposition. One of the remaining oppositions had been filed in the name of Ineos Europe Limited (opponent 1).

II. With letter dated 14 October 2011 opponent 1 indicated that its opposition had then been assigned to Ineos Commercial Service UK Limited. A further assignment to Ineos Sales (UK) Limited was communicated with letter dated 24 October 2013.

III. By a decision posted on 11 February 2015 the opposition division decided that the patent as amended according to the documents of auxiliary request I (claim 1 to 13 submitted with letter of 7 March 2014) met the requirements of the EPC. The decision was also based on the documents of the patent as granted forming the main request whose claim 1 read as follows:

"1. A high-density polyethylene composition comprising:

a first component, said first component is a high molecular weight ethylene alpha-olefin copolymer has (sic) a density in the range of 0.920 to 0.946 g/cm^3, and a melt index ($I_{21.6}$) in the range of 1 to 15 g/10 minutes; and a second component, said second component is a low molecular weight ethylene polymer has a density in the range of 0.965 to 0.980 g/cm^3, and a melt index (I_2) in the range of 30 to 1500 g/10 minutes;

wherein said high-density polyethylene composition has a melt index (I_2) of at least 1 g/10 minutes, a density in the range of 0.950 to 0.960 g/cm^3."

IV. Claim 1 of auxiliary request I corresponded to claim 1 as granted in which the range of values of the melt index ($I_{21.6}$) of the first component had been amended to be 2.5 to 11 g/10 minutes, instead of 1 to 15 g/10 minutes.

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

D1: WO 03/039984 A1
D2: JP 58-103 542 A1 and a translation in English thereof D2a
D3: EP 1 655 336 A1
D6: EP 1 146 077 A1
D7: WO 99/65039 A1
D8: WO 2006/045 550 A1
D9: WO 00/71 615 A1
D16: Experimental evaluation concerning flow rate ratio MFR_{21}/MFR_2 of a 1-butene/ ethylene copolymer polymerized in the presence of Lynx 200
D34: Chinese Journal of Polymer Science Vol. 26, No. 5, (2008), page 553
D35: Y. Kissin, Alkene Polymerisation Reactions with Transition Metal Catalysts, 1st Edition, Elsevier (2008) - pages 8, 9 and 44
D37: Standard deviation values of the flow direction shrinkage values indicated on page 21 of the patent in suit.

VI. In the present written decision, the expression "melt index" and its symbol I_x will be consistently employed for the sake of consistency, even if in some documentary evidence submitted the synonymous expression melt flow rate and its symbol MFR are used instead. I_2, I_{10} and $I_{21.6}$ should be understood to refer to the melt index under a load of 2,16, 10,16 and 21,6 Kg, respectively. Moreover, any passage of D2 indicated refers to the corresponding passage of the translation in English thereof D2a.

VII. The reasons for the contested decision which are of relevance for the appeal proceedings can be summarized as follows:

The composition of granted claim 1 lacked novelty over the composition described in Example 6 of D2, since the only feature not explicitly disclosed therewith, namely the melt index $I_{21.6}$, could be evaluated based on the calculation and assumption made by the opponents to fall within the claimed range. As to auxiliary request I the objections that its claim 1 would be anticipated by each of D1 and D7 failed to convince and novelty was therefore acknowledged. Concerning inventive step the closest prior art was considered to be represented by the disclosure of document D2, from which the composition according to claim 1 of auxiliary request I differed in that it contained a high molecular weight component having a melt index $I_{21.6}$ value as specified in that claim. As demonstrated by the examples of the patent in suit quoted as inventive, whose results were further analysed in D37, the objective problem solved by the subject-matter of claim 1 of auxiliary request I over the closest prior art could be seen as the provision of polyethylene compositions with improved dimension stability, i.e. with a shrinkage being consistently the same and having a high tolerance, especially when various pigments were used. Neither D2, nor any of the other documents referred to by the opponents suggested that the combination of features defined in said claim 1 would result in such a technical effect. On that basis an inventive step was acknowledged for the subject-matter of auxiliary request I.

VIII. Appeals against the above decision were lodged by the patent proprietor and opponent 2. The corresponding statements of grounds of appeal were submitted with letters of 19 June 2015 and 8 June 2015, respectively.

IX. The patent proprietor submitted with its statement of grounds of appeal ten auxiliary requests. The first six auxiliary requests were those labelled auxiliary requests I to VI submitted during the opposition proceedings with letter of 7 March 2014
and referred to as auxiliary requests 1 to 6 in the written submissions of the patent proprietor on appeal. Accordingly, the wording of auxiliary request 1 corresponded to that indicated for auxiliary request I on the basis of which the patent in suit was upheld (see section IV above). Claims 1 of auxiliary requests 4, 5 and 6 contained in comparison to claim 1 as granted the following additional wordings at the end of the claim:

Auxiliary request 4

"; and wherein said high-density polyethylene composition has a single ATREF temperature peak, wherein said ATREF temperature peak has a temperature peak maximum between about 90°C to about 105°C; wherein said high-density polyethylene composition has a calculated purge fraction of less than 15.5 percent"

Auxiliary request 5

", and a standard deviation of flow direction shrinkage of less than 7 percent across different colors"

Auxiliary request 6

", and further comprises 100 to 10,000 ppm by weight of a nucleator"

The additional independent claims of auxiliary request 6 were directed to a method of producing the high-density polyethylene composition of claim 1 (claim 5), to a bottle cap closure comprising the composition of claim 1 (claim 6) and to a method of improving bottle cap closures comprising the steps of providing a composition in accordance with claim 1, compression molding, blow molding, or injection molding said high-density polyethylene composition thereby forming said improved bottle cap closures (claim 8).

X. Within the time limit prescribed in Article 108 EPC a further notice of appeal dated 13 April 2015 had been filed "On behalf of Ineos Europe AG". The Registrar of the Board pointed out in the Notification of appeal file number of 20 April 2015 that the name of the appellant differed from the name of opponent 1. Thereupon the representative of the appellant indicated in his letter of 28 April 2015 that "*further to our letter of 13 April, we wish to clarify that the name of Appellant 1 (formerly Opponent 1) is Ineos Commercial Services (UK) Limited*". In a statement setting out the grounds of appeal filed with letter dated 19 June 2015, it was also indicated that said appeal was by "Ineos Commercial Services (UK) Limited".

XI. The letter on behalf of Ineos Commercial Services (UK) Limited of 19 June 2015 included the following evidence:

D38: EP 0 603 935 A1
D42: Experimental data concerning "composition X" on pages 6 and 7 of that letter.

XII. The rejoinders of the patent proprietor and of opponent 2 were submitted with letters of 2 November 2015 and 4 November 2015, respectively.

XIII. Additional submissions were made in the name of Ineos Commercial Services (UK) Limited with letter of 2 November 2015. The following document was submitted therewith:

D39: Confidential BP Solvay Polyethylene report "Programme enhanced premium, Project Number 73154001060".

XIV. The admissibility of the appeal filed on behalf of Ineos Europe AG was addressed by the Board in a communication of 19 November 2015.

XV. With letter of 15 December 2015, the representative of Ineos Sales (UK) Limited stated that the appeal originally filed on behalf of Ineos Europe AG and then corrected to Ineos Commercial Services (UK) Limited had to be considered as filed on behalf of opponent 1 (Ineos Sales (UK) Limited). The submissions made by Ineos Commercial Services (UK) Limited with letters of 19 June 2015 and 2 November 2015 were resubmitted by opponent 1 with said letter of 15 December 2015 as Annexes 1 and 2.

XVI. The admissibility of the appeal filed on behalf of Ineos Europe AG was addressed by the Board in a further communication of 14 March 2016.

XVII. A communication of the Board was sent in preparation of oral proceedings.

XVIII. Additional submissions by the patent proprietor were made with letter of 4 July 2018.

XIX. The oral proceedings before the Board took place on 10 July 2018 in the course of which auxiliary requests 2, 3 and 10 of the patent proprietor filed with its statement of grounds of appeal were withdrawn.

XX. As far as relevant to the present decision, the submissions of the patent proprietor can be summarized as follows:

Admissibility of the appeal on behalf of Ineos Europe AG

(a) It was agreed to the position taken by the Board in its communication of 19 November 2015 that the appeal on behalf of Ineos Europe AG was not admissible. In that case the submissions of opponent 1 filed on 15 December 2015 would be late-filed and should not be admitted into the proceedings.

Main Request - Novelty over D2

(b) Example 6 of D2 defined that the high molecular weight component of the composition described therein had a I_2 value of 0,051, but it did not contain any reference to a $I_{21.6}$ value for that component. However, no direct correlation between I_2 and $I_{21.6}$ values existed, so that the $I_{21.6}$ value of the high molecular weight component of the composition of Example 6 of D2 was unknown. The $I_{21.6}/I_2$ ratio depended on many factors, such as reaction conditions and catalysts used, including cocatalysts and composition features such as the overall molecular weight. The experimental evidence reported in D16 did not allow any conclusion on the $I_{21.6}$ value obtained in Example 6 of D2, not only because it was based on the use of a different catalyst and a different type of comonomer, but also because limited information on the processing conditions used in D16 was available. D34 referred to polydispersity values in the context of specific supported catalysts making reference to two unspecified documents and D35 gave a correlation between the polydispersity and the $I_{21.6}/I_2$ ratio by reference to a further document the content of which however was not known. Accordingly, there was no indication that the polydispersity values and relationship indicated in D34 and D35, respectively, could be applied in the context of D2 dealing with unsupported catalysts. Accordingly, there was no direct and unambiguous disclosure in Example 6 of D2 of a $I_{21.6}$ value as defined in claim 1 of the main request.

Auxiliary request 1 - inventive step

(c) Starting from the composition described in Example 6 of D2 as the closest prior art, from which the claimed composition differed by the use of the high molecular weight component having a melt index $I_{21.6}$ in the range of 2.5 to 11 g/10 minutes, the problem solved by the subject-matter of claim 1 could be formulated as the provision of compositions having improved shrinkage behaviour and consistency as defined as a lower standard deviation of flow direction shrinkage across multiple coloured and natural parts. Evidence for this improvement was provided with the experimental results contained in the patent in suit and their analysis in D37. One skilled in the art seeking to provide more consistent shrinkage over different colours, however, would find no motivation for changing anything from the compositions specifically described in D2 in order to solve said technical problem, as none of the compositions exemplified therein contained pigments, and because there was no appreciation whatsoever in that document that the shrinkage might vary over different compositions depending on the colourant added. In addition the process used for the manufacture of the claimed composition differed in many respects from the process used in Example 6 of D2, so that there was no indication that any result achieved within the framework of the patent in suit would be also achieved by modifying the teaching of D2. Also there was no indication that the equations provided in D34 and D35 would be applicable in the context of D2. Moreover, because the melt index I_2 of the overall composition was with Example 6 of D2 the highest of all exemplified compositions and an increase on I_2 had a negative impact on the environmental stress crack resistance of the product made with that composition, the skilled person would be reluctant to increase the melt index I_2 of the high molecular weight component used in Example 6 of D2. Even if the problem should be formulated as an alternative, the claimed solution would not be obvious, since the skilled person would not know how to modify the composition of Example 6 of D2 without compromising the other properties achieved in D2, in particular a melt index I_2 of at most 3.0 g/10 minutes. That an increase of the melt index I_2 of the high molecular weight component of Example 6 of D2 would lead to a high molecular weight component having a melt index $I_{21.6}$ in the range defined in claim 1 of auxiliary request 1 was entirely speculative. Accordingly, it had not been shown that the skilled person would arrive in an obvious way at the subject-matter of claim 1.

Auxiliary requests 4 and 5

(d) The ATREF feature inserted in claim 1 of auxiliary request 4 had three aspects, namely a single temperature peak, peak maximum location and maximum purge fraction. It was reflective of further properties of the preferred high density polyethylene composition, especially with regard to the branching distribution and crystallinity thereof, the purge fraction corresponding to the non-crystalline or amorphous fraction. Those features provided therefore additional limitations to the claimed subject-matter. Moreover, as shown in the specification, the inventive examples were representative of the ATREF feature. That feature was not described in the prior art. In addition, there was no basis for assuming that the very specific ATREF feature of claim 1 would be met by Example 6 of D2, in particular because the process used in Example 6 of D2 presented many differences from that used in the patent in suit and because 4-methyl-1-pentene used in Example 6 of D2 would affect crystallinity. The allegation that this feature had been introduced to disguise novelty was therefore unfounded. The opponents would be the ones carrying the onus of proof for the alleged lack of novelty over Example 6 of D2. Novelty was therefore to be acknowledged.

(e) The definition in auxiliary request 5 of a standard deviation of flow direction shrinkage of less than 7% across different colours reflected the problem solved by the invention. None of the cited documents cited by the opponents referred to shrinkage over different colours. It could not be said that all bimodal compositions would provide such result. Novelty was therefore to be acknowledged for the subject-matter of auxiliary request 5.

Auxiliary request 6

(f) Auxiliary request 6 required the composition to further comprise 100 to 10 000 ppm by weight of a nucleator. The examples in the patent in suit and their summary in D37 showed that the standard deviation of flow direction shrinkage across different colours was reduced if a nucleator was also present. It was reasonable to assume that this effect occurred also in the context of Example 6 of D2. This was particular advantageous as it resulted in a lower scrap rate. There was however no teaching in the prior art that would motivate the skilled person to modify Example 6 of D2 by including 100 to 10 000 ppm by weight of a nucleator for the purpose of reducing standard deviation of flow direction shrinkage across different colours. D6 had not been cited in appeal proceedings and was in any case not relevant to the issue of inventive step. The passage in paragraph [0006] of the patent in suit which had been misread by opponent 1 provided a description of what had been achieved with the invention of the patent in suit, but not any acknowledgement of a public prior art knowledge. The same arguments were valid when taken example 8 of D1 as the closest prior art. Accordingly, the subject-matter in accordance with auxiliary request 6 was inventive.

(g) The reasons why the subject-matter of auxiliary request 6 was considered to be inventive over D2 had been submitted with the statement of grounds of appeal and with the letter of 2 November 2015, in which it was indicated in particular that the cited prior art did not suggest the addition of a nucleator in order to reduce shrinkage variability. There was therefore no justification for opponent 1 to await the oral proceedings to present a new attack of inventive step starting from D6 as the closest prior art. Accordingly, this new line of reasoning which would necessitate an entirely new discussion on inventive step should not be admitted into the proceedings.

XXI. As far as relevant to the present decision, the submissions of the opponents can be summarized as follows:

Admissibility of the appeal on behalf of Ineos Europe AG

(a) It was not disputed that the appeal was filed in the name of Ineos Europe AG and then corrected to Ineos Commercial Services UK Limited, despite the fact that at that time the registered opponent 1 was Ineos Sales (UK) Limited. The appeal had nevertheless to be regarded as admissible because it was obvious who the correct appellant was and that the notice of appeal plus fee, and the subsequent statement of grounds of appeal, had been filed on behalf of the same party which contested the decision of the opposition division. This was confirmed by the fact that the patent proprietor had responded to the grounds of appeal, exactly as if it had been correctly filed. Thus there was no disadvantage to any other party by accepting that the appeal had in fact been filed by Ineos Sales (UK) Limited.

(b) If the appeal of opponent 1 was regarded as inadmissible, opponent 1 would automatically become respondent/party as of right under Article 107 EPC, as the decision had been appealed both by the patent proprietor and opponent 2. Therefore the letters of 19 June 2015 and 2 November 2015 on behalf of Ineos Commercial Services (UK) filed in response to the patent proprietor's grounds of appeal and in connection with the appeal of opponent 2, which letters had been resubmitted with letter of 15 December 2015 on behalf of opponent 1, should also be regarded as part of the appeal proceedings.

Main Request - Novelty over D2, D1 and D7

(c) The ratio of $I_{21.6}$ to I_2 was controlled by the catalyst used and was closely related to the polydispersity value of the polymer produced. Based on D34 and D35 a typical $I_{21.6}/I_2$ ratio of 26-43 could be calculated for titanium-magnesium catalysts. Taking such a ratio for the catalyst used in Example 6 of D2 which also was a titanium-magnesium catalyst and considering the I_2 value of 0,051 g/10 minutes disclosed for the high molecular weight component of that composition, one could calculate a $I_{21.6}$ value in the range of 1,33 to 2,19 g/10 minutes for said high molecular weight component. This also was confirmed by experimental report D16. Moreover, the high molecular weight component of the composition obtained with Example 6 of D2 exhibited a I_{10}/I_2 ratio of 10,5, meaning that the $I_{21.6}/I_2$ ratio for that high molecular weight component was much higher than the I_{10}/I_2 ratio.

(d) It had to be understood that the composition described in Example 8 of D1 had been prepared with the catalyst used in Example 1 of D38. D39 was an internal confidential document, but nevertheless proved that the skilled person trying to reproduce Example 8 of D1 would obtain a composition in accordance with claim 1 as granted. Moreover, D7 which disclosed all ranges defined in claim 1 as granted was also novelty destroying.

Auxiliary request 1

(e) Novelty of claim 1 was not contested.

(f) As regards inventive step, the closest prior art was constituted by the disclosure of either Example 6 of D2 or that of Example 8 of D1. Although it had been submitted in writing, opponent 2 did not pursue at the oral proceedings a line of attack starting from the disclosure of D9. The claimed subject-matter differed from the composition of Example 6 of D2 only it that the

$I_{21.6}$ of the high molecular weight component was slightly above that disclosed in that example. The experimental evidence relied upon by the patent proprietor did not provide a comparison with the closest prior art, but with a structurally more remote monomodal resin. Moreover, having regard to the experimental results contained in the patent in suit, the experts of opponent 1 believed that inorganic pigments acted as nucleating agents. The variation in shrinkage between different pigments was simply a function of the difference in the nucleating properties of each pigment, the addition of a more effective nucleating agent such as Milliken HPN-20E reducing the overall variability in nucleating effect with different pigments. The difference in the effect of nucleating agents such as pigments on monomodal resins when compared with bimodal resins was believed to take place because there was a degree of self-nucleation in a bimodal material due to the presence of very low molecular weight material and very high molecular weight chains, which were not present in a monomodal material. In that respect it was believed that the $I_{21.6}$ of the high molecular weight component of the claimed bimodal resin did not have any influence on the effect of a nucleating agent/pigment. Accordingly, the problem successfully solved by the claimed subject-matter could only reside in the provision of an alternative composition. Claim 1 of D2 specified that the I_2 of the high molecular weight component could be increased up to 0,2, preferably up to 0,1 g/10 minutes. The skilled person following the teaching of D2 would have every reason to make a composition similar to Example 6 but with a higher I_2 corresponding also to a higher $I_{21.6}$ arriving thereby in an obvious way to compositions falling within the ambit of claim 1 of auxiliary request 1. In that context, the composition of Example 6 of D2 exhibited a I_{10}/I_2 ratio of 10,5 which meant that the $I_{21.6}/I_2$ ratio had to be much higher than 10,5. A similar analysis also applied starting from Example 8 of D1 as the closest prior art. Accordingly, the subject-matter of claim 1 of auxiliary request 1 lacked an inventive step.

Auxiliary requests 4 and 5

(g) The ATREF feature contained in auxiliary request 4 was unusual, randomly selected, having no connection with the alleged invention making it difficult for the opponents to assess novelty over Example 6 of D2. The patent in suit did not even contain any information on how it was to be obtained. Accordingly, all other features being disclosed in Example 6 of D2, in particular the density of the resin which was dependent on the content of amorphous material, it had to be assumed that the ATREF feature was also fulfilled by the composition described in Example 6 of D2 and that this feature had been used to disguise novelty. There was in particular no evidence that the use of a different process in Example 6 of D2 would not lead to the ATREF characteristic. Accordingly, claim 1 of auxiliary request 4 also lacked novelty over Example 6 of D2.

(h) In auxiliary request 5 the feature of a standard deviation of flow direction shrinkage of less than 7% across different colours defined a result to be achieved, which result, however, was also achieved by any bimodal resin. This could be seen in the light of evidence D42 concerning a bimodal composition X close to the composition of Example 8 of D1. A difference vis-à-vis Example 6 of D2 also had not been demonstrated. Novelty of the subject-matter of auxiliary request 5 was therefore to be denied.

Auxiliary request 6

(i) It was not disputed that addition of a nucleating agent to the composition of Example 6 of D2 would result in a reduction of the standard deviation of flow direction shrinkage across different colours. However, the patent itself admitted on page 2, lines 43-44 that nucleating agents such as HPN-20E were well known additives to reduce the variation in shrinkage. Since it was the only advantage observed, it was obvious to add said compound. Moreover, nucleating agents were conventional additives for bimodal polyolefin resins as shown in paragraph [0063] of D3, page 19, lines 25-27 of D8 and paragraph [0023] and Example 1 of D6, D6 showing that as a result of the addition of nucleating agents the mechanical properties were improved, meaning that the improvement in terms of shrinkage behaviour was a mere bonus effect obtained while improving in an obvious manner the mechanical properties. Accordingly, the claimed subject-matter lacked an inventive step over D2.

(j) The patent proprietor had submitted arguments in relation to inventive step of the subject-matter of auxiliary request 6 only one week before the oral proceedings, including the indication that the addition of nucleators to reduce the variation in shrinkage, mentioned on page 2, lines 43-44 of the specification, was a description of the invention in accordance with the patent in suit and not an acknowledgement of the prior art knowledge. Accordingly, it was justified to admit into the proceedings the objection that claim 1 lacked an inventive step over D6.

XXII. The appellant-patent proprietor requested that the decision under appeal be set aside and that the patent be maintained as granted (main request), or alternatively be maintained on the basis of the claims of one of auxiliary requests 1, 4, 5, 6, 7, 8 or 9 filed with its statement of grounds of appeal.

XXIII. Appellant-opponent 2 requested that the decision under appeal be set aside and that the patent be revoked.

XXIV. Opponent 1 requested that the appeal of the patent proprietor be dismissed and supported appellant-opponent 2's request that the patent be revoked.

Reasons for the Decision

Admissibility of the appeal on behalf of Ineos Europe AG

1. According to Article 107, first sentence, EPC a party to proceedings adversely affected by a decision may appeal. When an appeal has been filed, the identity of the true appellant must be established by expiry of the two month time limit prescribed in Article 108, first sentence, EPC at the latest (G 1/12, OJ EPO 2014, A114, Reasons Nrs. 20 and 23). Nevertheless, if a board notices that the name of the appellant does not correspond to that of a party to the proceedings, it

may point out such deficiency in a communication under Rule 101(2) EPC, and the name may be corrected in the reply to such communication if the correction does not reflect a later change of mind as to whom the appellant should be, but on the contrary only expresses what was intended when filing the appeal (G 1/12, Reasons Nr. 29). The name of the appellant may also be corrected under Rule 139 EPC provided the aforementioned condition is fulfilled (G 1/12, Reasons Nr. 40).

1.1 In the present case no communication under Rule 101(2) EPC was issued, but the Registrar of the Board pointed out in the Notification of appeal file number of 20 April 2015 that the name of the appellant differed from the name of opponent 1. Thereupon the representative of the appellant declared with letter of 28 April 2015 "that the name of Appellant 1 (formerly Opponent 1) is Ineos Commercial Services (UK) Limited". This letter could therefore be seen as a request for correction under Rule 139 EPC. Such correction must introduce what was originally intended (G 1/12, Reasons Nr. 37(a)). According to the letter of 28 April 2015 it was thus the original intention to file the appeal on behalf of Ineos Commercial Services (UK) Limited. This intention was confirmed by the fact that in the statement of grounds of appeal of 19 June 2015 Ineos Commercial Services (UK) Limited was mentioned as appellant. As neither Ineos Europe AG nor Ineos Commercial Services (UK) Limited were party to the present proceedings when the appeal was filed, neither of them were entitled to appeal the decision of the opposition division under Article 107, first sentence, EPC.

1.2 Accordingly, the appeal on behalf of Ineos Europe AG is to be rejected as inadmissible. The same conclusion would apply if the request for correction of the name of the appellant to Ineos Commercial Services (UK) Limited had been allowable. As a consequence, opponent 1 is party as of right under Article 107, second sentence, EPC.

Admittance of the submissions made by opponent 1 and on behalf of Ineos Commercial Services (UK) Limited

2. The submissions of Ineos Commercial Services (UK) Limited were duly considered and taken into account by the patent proprietor, as shown in its letter of 2 November 2015, in which a detailed response thereto was provided. Accordingly, there is no justification to disregard the objections initially raised in the name of Ineos Commercial Services (UK) Limited, as they were endorsed by opponent 1 as a party as of right to the appeal proceedings pursuant to Article 107, second sentence, EPC.

Main request

Novelty over D2

3. Example 6 of D2 (page 10, lines 24-29 and page 14, Table 1) describes an ethylene copolymer composition having a melt index I_2 of 1,31 g/10 minutes and a density of 0,959 g/cm^3, which composition is a blend of (i) a low molecular weight ethylene polymer with a density of 0,974 g/cm^3 and a melt index I_2 of 240 g/10 minutes and (ii) a high molecular weight ethylene 4-methyl-penten-1 copolymer with a density of 0,939 g/cm^3, a melt index I_2 of 0,051 g/10 minutes and a ratio of the melt index I_{10} to the melt index I_2 of 10,5. This means based on the known values of the melt index I_2 and of the ratio of the melt index I_{10} to the

melt index I_2 that the high molecular weight component of the ethylene copolymer composition described with Example 6 of D2 is disclosed to exhibit a melt index I_{10} of 0,54 g/10 minutes.

3.1 It is indisputed that Example 6 of D2 explicitly describes all features of present claim 1 to the exception of the melt index $I_{21.6}$ of the high molecular weight component. The views of the parties, however, diverge on whether said feature is to be considered as implicitly disclosed, i.e. as to fall within the range of 1 to 15 g/10 minutes as required by the wording of operative claim 1.

3.2 Arguments advanced by the opponents were either based on experimental report D16 or on estimations based on the teaching of D34 and D35. D16 describes the preparation of a high molecular weight ethylene 1-butene copolymer component using a specific catalyst, namely Lynx 200, and under specific polymerisation conditions. The estimations made in view of D34 and D35 are based on the indication in D34 that polydispersity values of polyethylene produced with titanium-magnesium catalysts "*are usually within the range of 4-8*" (Introduction, 4th sentence) and the teaching in D35 that a correlation between the $I_{21.6}/I_2$ ratio for polyethylene prepared with multi-center catalysts and its polydispersity "*can be approximated as* $M_w/M_n \approx 0.24\ I_{21}/I_2 - 2.4$" (page 44, last sentence of 2nd paragraph). There is however no indication that D16 represents a rework of what was exactly done in Example 6 of D2, in particular in respect of the nature of the catalyst, or that the technical information provided in D34 and D35 retains its validity in a different specific situation such as that of Example 6 of D2. The use of the terms "usually" and "can be approximated" in

D34 and D35, respectively, already show that not all polyethylene compositions produced with titanium-magnesium catalysts can be expected to exactly follow those rules, meaning that it cannot be said that the melt index $I_{21.6}$ of the high molecular weight component of the composition produced in Example 6 of D2 must necessarily be within the range of 1,33 to 2,19 g/10 minutes computed by opponent 1 on the basis of D34 and D35.

3.3 However, the question whether a value of the melt index $I_{21.6}$ of the high molecular weight component used in Example 6 of D2 is in the range of claim 1 of the patent in suit can be answered in view of the melt indices I_2 and I_{10} of the high molecular weight component disclosed in D2.

3.3.1 Molten polyolefins are known to the skilled person to be non-Newtonian liquids which means that their viscosity decreases with the speed at which the pressure applied to them causes them to flow, i.e. the faster the molten olefin flows the less viscous it becomes. As a result of this behaviour, a change of load from 2,16 to 10,16 kg when measuring melt indices will result in a ratio of the melt index I_{10} to the melt index I_2 which is higher than the ratio of the loads applied (about 4,7) as illustrated by Example 6 of D2 where a ratio of the melt index I_{10} to the melt index I_2 of 10,5 is obtained, i.e. about twice the ratio of the loads applied. Similarly, a change of load from 10,16 to 21,6 kg will result in a ratio of the melt index I_{21} to the melt index I_{10} which is higher than 21,6/10,16, i.e higher than about 2,1, meaning that the high molecular weight component obtained in Example 6 of D2 taking into account the melt index I_{10} disclosed for that component, namely 0,54 g/10 minutes as shown in above point 3, will exhibit a melt index $I_{21.6}$ of at least 0,54 x 2,1 g/10 minutes, i.e. of at least 1,13 g/10 minutes.

3.3.2 Moreover, it was not submitted (and it is not credible) that the melt index $I_{21.6}$ of the high molecular weight component of Example 6 of D2 could exceed the upper value defined in operative claim 1. In this respect, having regard to the ratio of the melt index I_{10} to the melt index I_2 of 10,5 for a ratio of the loads applied of 4,7, there is no reason to expect that a change of load from 10,16 to 21,6, corresponding to a ratio of the loads applied of about 2,1, would lead to ratio of the melt index $I_{21.6}$ to the melt index I_{10} as high as 28 which would be required to obtain a melt index $I_{21.6}$ of the high molecular weight component higher than the upper limit defined in operative claim 1.

3.3.3 Accordingly, the person skilled in the art would objectively consider that a melt index $I_{21.6}$ of the high molecular weight component within the range defined in claim 1 as granted is necessarily implied by the explicit disclosure of Example 6 of D2.

3.4 Consequently, the composition of Example 6 of D2 is a composition in accordance with the terms of claim 1 of the main request, which claim 1 therefore lacks novelty (Articles 100(a), 52(1) and 54(2) EPC). Therefore, the main request is not allowable.

3.5 Two additional objections that the subject-matter of claim 1 lacked novelty were made over Example 8 of D1 and over D7 by opponent 1 and opponent 2, respectively. However, in view of the above conclusion it is not necessary to decide on those objections.

Auxiliary request 1

Novelty

4. The opponents stated they had no novelty objections against claim 1 of auxiliary request 1 which differs from claim 1 as granted in that the melt index $I_{21.6}$ of the high molecular weight component is amended to be 2,5 to 11 g/10 minutes instead of 1 to 15 g/10 minutes. The Board has no reason to take another view. As regards novelty over the composition disclosed with Example 6 of D2, there is no reason similarly to the calculation made in respect of the main request to expect based on the ratio of the melt index I_{10} to the melt index I_2 of 10,5 for a ratio of the loads applied of 4,7 that a change of load from 10,16 to 21,6, corresponding to a ratio of the loads applied of about 2,1, would lead to a ratio of the melt index $I_{21.6}$ to the melt index I_{10} as high as 20, which ratio would be necessary for having a melt index $I_{21.6}$ of the high molecular weight component above the upper value defined in claim 1 of auxiliary request 1, meaning that the melt index $I_{21.6}$ of the high molecular weight component of the composition of Example 6 of D2 is necessarily below the upper value defined in claim 1 of auxiliary request 1. However, it cannot be established with a sufficient degree of certainty that said ratio of the melt index $I_{21.6}$ to the melt index I_{10}, which is necessarily above 2,1 (see above) is at least 4,6 so that it cannot be concluded that the melt index $I_{21.6}$ of the high molecular weight component of the composition of Example 6 of D2 would be at least 2,5 g/10 minutes corresponding to the minimum value required by the wording of claim 1 of auxiliary request 1. Accordingly, novelty of the subject-matter of claim 1 of the auxiliary request 1 is acknowledged.

Inventive step

Closest prior art

5. In line with the reasons for the contested decision, the patent proprietor and the opponents agree that the disclosure of D2, in particular its Example 6 represents a suitable starting point for assessing inventive step. The Board has no reason to take a different view, in particular because the compositions of D2 like those of the patent in suit are used for the preparation of bottle cap closures by injection moulding, which compositions should result in acceptable shrinkage behaviour and mechanical properties of the cap closures prepared (claim 1, Table 3, page 16 and paragraph bridging pages 12 and 13). Having regard to the assessment of novelty provided above, the composition in accordance with claim 1 of auxiliary request 1 differs from the composition disclosed with Example 6 of D2 only in that the high molecular weight component of this composition has a melt index ($I_{21.6}$) in the range of 2.5 to 10 g/10 g/10 minutes.

Problem successfully solved

6. Having regard to the disclosure of Example 6 of D2, the patent proprietor submitted that the technical problem solved by the subject-matter of operative claim 1 is that set out in paragraph [0006] of the specification, namely the provision of a composition leading to an improved shrinkage behaviour in the sense that the standard deviation of flow direction shrinkage as a percentage of the mean shrinkage across multiple coloured and natural parts is lowered. It is implicit in the light of paragraphs [0006] and [0007] of the

specification that this problem relates to the preparation of closure devices by injection moulding.

6.1 As evidence that said technical problem is successfully solved by the subject-matter of operative claim 1, the patent proprietor refers to the comparative data contained in the patent in suit (results summarized in the table on page 21), supplemented by a statistical analysis thereof provided with D37. The comparative tests relied on by the patent proprietor concern comparisons between compositions comprising various pigments and various bimodal resins in accordance with the present invention (examples using resins "Inventive 1" to "Inventive 6") or a resin "Comparative A" not in accordance with the present invention.

6.2 According to established jurisprudence, in the case where comparative tests are chosen to demonstrate an inventive step with an improved effect over a claimed area, the nature of the comparison with the closest state of the art must be such that the effect is convincingly shown to have its origin in the characterising feature(s) of the invention. For this purpose it may be necessary to modify the elements of comparison so that they differ only by such a characterising feature or features (see T 197/86, EPO OJ 1989, 371, points 6.1.2 and 6.1.3 of the reasons).

6.3 In the present case, however, the resins compared in the tests addressed by the patent proprietor have not been shown to differ exclusively by virtue of the feature differentiating the claimed compositions from that constituting the closest prior art, i.e. the melt index $I_{21.6}$ of the high molecular weight component, as the characteristics of the resin of Comparative Example A whose shrinkage behaviour is compared to those of the present invention are even not specified. In that regard, opponent 1 indicated that the commercial resin used in Comparative Example A, which is stated in paragraph [0083] of the specification to be available under the trade name B40201331N from INEOS Olefins & Polymers, USA, i.e. a product of a company affiliated to opponent 1, is not a bimodal resin as in the closest prior art, but a monomodal resin, which was not disputed by the patent proprietor. Accordingly, a causal link between any possible improvement of the shrinkage behaviour and the feature characterising the claimed invention from the closest prior art has not been shown with the experimental evidence relied on by the patent proprietor. In the absence of any technical explanation by the patent proprietor as to why it would be nevertheless credible that an improvement would be achieved over the resin compositions of Example 6 of D2, which are structurally far closer to the claimed resins than the monomodal resin serving as comparison in the tests relied on by the patent proprietor, the Board has no reason to consider that the alleged improvement in terms of shrinkage behaviour has been rendered credible.

6.4 Under such circumstances, the alleged improvement in terms of shrinkage behaviour cannot be retained in the formulation of the problem effectively solved over the closest prior art and the latter has to be reformulated as residing in the provision of further compositions suitable for the preparation of closure devices by injection moulding.

Obviousness of the solution

7. It remains to be decided whether the skilled person desiring to solve the problem identified above, would,

in view of the closest prior art, possibly in combination with other prior art or with common general knowledge, have modified the disclosure of the closest prior art in such a way as to arrive at the claimed subject matter.

7.1 D2 itself teaches in claim 1 that the high molecular weight component and the low molecular weight component of the polyolefin composition may have a melt index I_2 in the range of 0,01 to 0,2 g/10 minutes and in the range of 5 to 2000 g/10 minutes, respectively, whereas in Example 6 of D2 the high molecular weight component has a melt index I_2 of 0,051 g/10 minutes and the low molecular weight component has a melt index I_2 of 240 g/10 minutes. The act of varying the melt index I_2 of the high and/or low molecular weight component within the ranges taught in claim 1 of D2 is within the routine activity of the skilled person faced with the mere problem of providing further compositions suitable for the preparation of closure devices by injection moulding. In other words, varying the melt index I_2 of the high and/or low molecular weight component within the ranges defined in claim 1 of D2 with the mere objective to put into practice the teaching provided by that document also concerned with the preparation of closure devices by injection moulding does not involve any inventive activity. It remains to be seen whether the skilled person by applying that obvious measure would arrive at something falling within the scope of claim 1 of auxiliary request 1.

7.2 As shown in above points 3.3 and 4, it was concluded that the high molecular weight component of the composition disclosed in Example 6 of D2 with a melt index I_2 of 0,051 g/10 minutes has a melt index $I_{21.6}$ which is not exactly known, but is necessarily of at least 1,3 g/10 minutes and is not necessarily of at least 2,5 g/10 minutes.

7.3 Based on the known ratio for the melt index I_{10} to the melt index I_2 of 10,5 for the high molecular weight component of the composition disclosed in Example 6 of D2, it can be deduced that for that high molecular weight component the ratio of the melt index I_{21} to the melt index I_2 is at least 10,5 x 2,1 (ratio of the loads 21,6 and 10,16), i.e. at least 22, since that component exhibits a non-Newtonian behaviour. On that basis it can be established that the skilled person repeating the teaching of Example 6 of D2 while increasing the melt index I_2 of the high molecular weight component, which includes keeping the same catalytic system, will obtain a high molecular weight component exhibiting a melt index $I_{21.6}$ of at least 2,5 g/10 minutes, when the melt index I_2 of the said component is less than 2,5/22 g/10 minutes, i.e. less than 0,12 g/10 minutes which is in the middle of the range of 0,01 to 0,2 g/10 minutes indicated in D2. Accordingly, the skilled person by applying the obvious measure of varying the melt index I_2 of the high molecular weight component of the composition of Example 6 of D2 within the range taught in that document, in particular towards the middle of that range, will inevitably obtain a high molecular weight component in accordance with the definition given in operative claim 1. In that respect, it was not disputed that the above variation of the melt index I_2 would not impact the density of the high molecular weight component.

7.4 The argument of the patent proprietor that the skilled person wishing to solve the above problem would be reluctant to increase the melt index I_2 of the high molecular weight component of the composition of Example 6 of D2, because the melt index of the overall composition in that example is already the highest of all examples of D2, is not convincing. It is true that D2 requires in claim 1 that the melt index I_2 of the overall composition must be kept at a value of at most 3,0 g/10 minutes. Accordingly, the skilled person applying the obvious measure of increasing the melt index I_2 of the high molecular weight component towards the middle of the range taught in D2 (see point 7.3 above) would realize that by doing so it would most probably obtain an overall composition which meets the condition of a melt index I_2 of at most 3,0 g/10 minutes as also taught in claim 1 of D2. Should it not be the case, the skilled person in order to adhere to the teaching of D2 and not to exceed that upper value of the melt index I_2 of the overall composition would decrease in an obvious manner the melt index I_2 of the low molecular weight component of the composition described in Example 6 of that document realizing that with a value of 240 g/10 minutes it is well above the minimum value of 5 g/10 minutes taught in claim 1 of D2.

7.5 Moreover, the argument that D2 aims at achieving a suitable Environmental Stress Crack Resistance as shown in Table 3 on page 16, which would imply according to the patent proprietor that the skilled person would not know how to modify the composition of Example 6 of D2 without compromising the properties obtained with that embodiment, must fail, because the answer to the question as to what a person skilled in the art would have done in the light of the state of the art depends on the technical result he had set out to achieve (see T 0939/92, OJ EPO 1996, 309, points 2.4.2 and 2.5.3 of the reasons). In the present case, the skilled person is merely seeking to provide further compositions suitable for the preparation of closure devices by injection moulding, but is not wishing to keep all properties obtained with the composition of Example 6 of D2 at the same level (see point 6.4 above).

7.6 The Board nevertheless notes that the results shown in Table 3 on page 16 of D2 and the passage on page 6, lines 6-10 suggest that the use of a high molecular weight component having a melt flow index I_2 within the range defined in claim 1 of D2 leads to a suitable Environmental Stress Crack Resistance. Accordingly, the skilled person, even if he also wanted to obtain compositions which in addition exhibit a suitable Environmental Stress Crack Resistance, would not be barred from increasing the melt flow index I_2 of the high molecular weight component of the composition of Example 6 of D2 when remaining within the teaching of D2.

7.7 Therefore, the subject-matter of claim 1 of auxiliary request 1 includes compositions which are obvious to a person skilled in the art with the consequence that it does not meet the requirement of Article 56 EPC. Consequently, auxiliary request 1 is also not allowable.

Auxiliary requests 4 and 5

Novelty over D2

8. Compared to claim 1 as granted, which the Board found to lack novelty over Example 6 of D2, the composition in accordance with claim 1 of auxiliary requests 4 and 5 has been defined using two additional parametric definitions, namely "wherein said high-density

polyethylene composition has a single ATREF temperature peak, wherein said ATREF temperature peak has a temperature peak maximum between about 90°C to about 105°C; wherein said high-density polyethylene composition has a calculated purge fraction of less than 15.5 percent" and "and a standard deviation of flow direction shrinkage of less than 7 percent across different colors", respectively. The parametric definition added in claim 1 of auxiliary request 4 undisputedly reflects the comonomer distribution, the level of branching and the amount of the non-crystalline or amorphous fraction of the composition. The parametric condition added in claim 1 of auxiliary request 5 is defined in terms of a result to be achieved. The patent proprietor argued that these features inserted in claim 1 of auxiliary requests 4 and 5 would not be described in D2 and that the opponents would be the ones carrying the burden of proof for the alleged lack of novelty of the claimed subject-matter over Example 6 of D2.

9. After the grant of the patent, i.e. after the end of the examination proceedings, a legal presumption exists that the patent meets the requirements of the EPC. However, this presumption can be rebutted on the basis of the grounds for opposition mentioned in Article 100 EPC (T 0063/06, point 3.3.1 of the reasons), which rebuttal requires substantial arguments and evidence from the opponents' side.

9.1 The presumption that the subject-matter of the patent in suit inter alia was not described in the prior art was based on the combination of features contained in claim 1 as granted, also present in all additional independent claims, but obviously not on the features inserted now in claim 1 of auxiliary requests 4 and 5, which were defined only in dependent claims 4 and 9 and whose ability to confer novelty over the prior art was obviously not examined before the examination division. Accordingly, in the present case, where the subject-matter of claim 1 of the granted patent was convincingly shown to lack novelty over the disclosure of D2 (see point 3.4 above), the legal presumption of validity of the granted patent has been rebutted, so that it cannot be said that it is automatically up to the opponents to convince the Board that the subject-matter now defined in auxiliary requests 4 and 5 lacks novelty. The board is of the view that in the present case it is instead the task of the patent proprietor to present convincing arguments as to why the modifications to the granted patent present in operative claims 1 of auxiliary requests 4 and 5 restore novelty over Example 6 of D2. Who bears the burden of proof may be determined by the legal cases which the respective parties are trying to make. Whether it is discharged or not is assessed by the board based on all the relevant evidence put before it (see T 0518/10, point 7.10.1 of the reasons).

9.2 In this respect, a mere difference in wording, be it an additional parameter or a specific result to be achieved, is alone insufficient to confer novelty, so that the mere argument that these features or the result to be achieved now inserted in auxiliary requests 4 and 5 are not described in D2 is not decisive. It is rather necessary for the patent proprietor in order to shift the burden of proof to the opponents to present convincing arguments as to render credible that the synthesis described with Example 6 of D2 cannot lead to the physical structure defined by the ATREF profile or the result in terms of shrinkage, now expressed by the features added in auxiliary requests 4 and 5.

9.3 The patent proprietor relied for this purpose on the fact that specific measures were used in Examples 1 to 6 of the patent in suit, i.e. a dual-sequential gas phase polymerization, whereas the product obtained with Example 6 of D2 was obtained by blending the high and low molecular weight components prepared individually by slurry phase polymerization. It was also argued that the comonomer used in Example 6 of D2, namely 4-methyl-1-pentene would affect affect the crystallinity of the compound prepared and therefore the purge fraction. However, the patent in suit itself allows the use of various comononers, including 4-methyl-1-pentene (see paragraph [0048], lines 55) and the preparation of the claimed composition by blending of the polymers separately prepared (see paragraph [0077]), which preparation includes slurry phase polymerization (paragraph [0072], line 37). Moreover, the teaching of the patent in suit does not link the ATREF profile defined in claim 1 of auxiliary request 4 to the obligatory use of features differing from those employed in Example 6 of D2. While 4-methyl-1-pentene may have an influence on the amount of the non-crystalline portion of the copolymer produced, this does not automatically lead to the conclusion that the purge fraction for the composition prepared in Example 6 of D2 is likely to be above the value of 15,5%, as in particular that value does not only depend on the type of comonomer used, as demonstrated by Examples 1 to 6 of the patent in suit in which large variations from 8,3% to 14,2 % for the purge fraction are obtained despite the use of the same comonomer (hexene).

9.4 Moreover, the patent proprietor did not provide any technical reason why the other features characterizing the method of preparation used in Example 6 of D2 would lead to a ATREF profile which differs from that defined in auxiliary request 4. As regards the shrinkage behaviour in terms of a standard deviation of flow direction shrinkage across different colors, no reason was provided as to why the composition prepared in Example 6 of D2 which is prepared in a process according to the general teaching of the patent in suit should not fulfill the condition set out in claim 1 of auxiliary request 5, especially as the various colours involved in the measurement of the flow direction shrinkage are even not specified.

9.5 Under these circumstances, the arguments submitted by the patent proprietor as to why the amendments introduced in claims 1 of auxiliary requests 4 and 5 restore novelty over Example 6 of D2 lack any substantiation and are merely speculative. Accordingly, there is no reason for the Board to consider that the amendments introduced into claim 1 of auxiliary requests 4 and 5 overcome the finding of lack of novelty in respect of the main request. Accordingly, novelty cannot be acknowledged for the subject-matter of claim 1 of auxiliary requests 4 and 5 which are therefore not allowable.

Auxiliary request 6

10. Compared to claim 1 as granted, the composition of claim 1 of auxiliary requests 6 has been defined to further comprise 100 to 10000 ppm by weight of a nucleator. The only objections raised by the opponents against auxiliary request 6 were that its subject-matter lacked an inventive step over the composition

described in Example 6 of D2 or alternatively over the composition disclosed with Example 8 of D1, opponent 1 also submitting after the debate on those objections a separate objection of lack of inventive step starting from document D6 as the closest prior art, whose admittance into the appeal proceedings is dealt with in point 16 infra.

Inventive step over D2

11. In view of the analysis of the disclosure of Example 6 of D2 provided in above points 3 to 3.3.3, the now claimed high-density polyethylene composition differs from said composition constituting the closest prior art in that it further comprises 100 to 10000 ppm by weight of a nucleator.

Problem successfully solved

12. Having regard to the disclosure of the closest prior art, the patent proprietor submitted that the technical problem solved by the subject-matter of operative claim 1 over D2 was the same as that formulated in respect of auxiliary request 1, namely the provision of a composition leading to an improved shrinkage behaviour in the sense that the standard deviation of flow direction shrinkage as a percentage of the mean shrinkage across multiple coloured and natural parts is lowered, leading to a reduced scrap rate.

12.1 In order to demonstrate that this problem was effectively solved by the subject-matter of operative claim 1, the patent proprietor relied on the experimental data shown on page 21 of the specification, which are also summarized in D37. The comparison offered was not made with the composition described in the closest prior art, i.e. Example 6 of D2, but with other compositions also in accordance with the wording of claim 1 as granted which did not contain a nucleator.

12.2 It is not disputed that said experimental comparison demonstrates a causal link between the improvement of shrinkage consistency across multiple coloured and natural parts and the use of a nucleator only in the context of specific high-density polyethylene compositions in accordance with claim 1 as granted, but not in the context of the closest prior art.

12.3 Nevertheless, according to the jurisprudence of the Boards of Appeal (see Case Law of the Boards of Appeal of the EPO, 8th edition, 2016, I.D.10.9, in particular T 35/85, point 4 of the reasons) the applicant or 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. In the opinion of the Board, what counts in the present case is whether the effect which results from the use of a nucleator and which was demonstrated in the framework of the above mentioned specific compositions in accordance with claim 1 as granted can be considered to take place also when said nucleator would be used in the context of the composition identified as the closest prior art, namely Example 6 of D2.

12.4 In this respect, it was not disputed by the opponents that this would be the case. On the contrary, the experts of opponent 1 believed that inorganic pigments are nucleating agents, which cause more rapid crystallisation in solidifying polymers, the variation in shrinkage between different pigments being simply a function of the difference in the nucleating properties of each pigment. As a result of the addition of known nucleating agents such as HPN-20E, whose nucleating effect was much higher than that of the various pigments, the nucleating effect of the pigment became less preponderant reducing the overall variability effect with different pigments. This explanation of the technical effect underlying the present invention was not disputed by the opponents and appears to the Board credible, so that the Board is convinced that the same effect would take place in the context of Example 6 of D2.

12.5 Accordingly, the Board is satisfied that the compositions as defined in operative claim 1 provide a successful solution to the problem formulated by the patent proprietor.

Obviousness of the solution

13. It must still be decided whether, as was argued by the opponents, the skilled person desiring to solve the problem identified above, would have found it obvious to add a nucleator to the composition of the closest prior art.

13.1 The opinion of the experts of opponent 1 indicated in above point 12.4, although it represents a credible explanation of the technical effect addressed in the patent in suit, which explanation was made in the light of the knowledge of the teaching of the patent in suit and consequently after its filing, does not represent any evidence of the existence of a prior art knowledge which would have suggested the claimed solution to the skilled person.

13.2 Furthermore, contrary to the opinion of opponent 1, the phrase in paragraph [0006] of the specification "*Furthermore, addition of nucleators, potassium stearate or Milliken HPN-20E, reduce this standard deviation further and are therefore more preferred*" does not constitute any acknowledgement by the patent proprietor that such addition was known in the art. This phrase immediately follows the passage "*In the instant invention, the polymer composition in either natural or colored form provides improved consistency as defined as a lower standard deviation of flow direction shrinkage as a percentage of the mean shrinkage across multiple colored (and natural) parts. This helps customers in that parts having too low or too high shrinkage are not made leading to lower scrap rates*", which undisputedely refers to the present invention. Accordingly, the <u>further</u> reduction of <u>this</u> (emphasis added by the Board) standard deviation (i.e. that mentioned in the sentence preceding the sentence cited by opponent 1) by addition of nucleators, potassium stearate or Milliken HPN-20E unambiguously refers to a further improvement of the invention in accordance with the patent in suit, but constitutes by no means an acknowledgement of any knowledge of the skilled person at the date of filing of the patent in suit.

13.3 The prior art documents cited by the opponents regarding the use of nucleators, namely D3 (paragraph [0063]), D8 (page 19, lines 25-27) and D6 (paragraph [0023] and Example 1) deal with the use of such compounds in multimodal polyethylene compositions, but do not address their influence on the shrinkage behaviour of the composition, let alone when pigments are used.

13.4 Opponent 1 also alleged that said observed effect would be a so-called bonus effect, as it would result from the obvious use of a nucleator in the light of D6 in order to improve the mechanical properties of the caps produced with Example 6 of D2. Firstly, the patent in suit, although it addresses the mechanical properties of bottle caps (see paragraph [0006]), does not address the need for any improvement in this respect, let alone that such improvement would be obtained by addition of a nucleator. Secondly, the essential problem addressed in the patent in suit is the reduction of shrinkage across multiple coloured (and natural) parts. Accordingly, it cannot be held that the reduction of shrinkage obtained with the claimed composition is a side effect which would result from an obvious measure suggested by D6 for solving another problem mentioned in the patent in suit. Accordingly, the Board is satisfied that the prior art does not render the proposed solution obvious.

Inventive step over D1

14. Opponent 1 considered that the composition disclosed in Example 8 of D1 also constituted a suitable starting point for assessing inventive step. All parties agreed that the subject-matter of operative claim 1 differ from the disclosure of Example 8 of D1 at least in the presence of 100 to 10000 ppm by weight of a nucleator. As both opponents submitted that their arguments brought forward in support of their objection of inventive step starting from Example 6 of D2 as closest prior art would equally apply to the additional

objection starting from Example 8 of D1, it follows that based on the same reasoning as provided in above points 12 to 15, the Board also concludes that the subject-matter of claim 1 of auxiliary request 6 is inventive over the disclosure of Example 8 of D1.

Conclusion on inventive step

15. Consequently, the subject-matter of present claim 1 and by the same token that of dependent claims 2 to 4, as well as the subject-matter of claim 5 directed to a method of producing the high-density polyethylene composition of claim 1, that of claim 6 directed to a bottle cap closure comprising the composition of claim 1 and that of claim 8 directed to a method of improving bottle cap closures comprising the steps of providing a composition in accordance with claim 1, compression molding, blow molding, or injection molding, said high-density polyethylene composition thereby forming said improved bottle cap closures, meet the requirements of Article 56 EPC.

Admittance of a new inventive step objection

16. After the announcement at the oral proceedings of the conclusion of the Board in respect of the above objections of lack of inventive step over D2 and D1 against claim 1 of auxiliary request 6, opponent 1 raised a new inventive step objection starting from document D6 as the closest prior art. This represents a change to the complete case of opponent 1 as defined in Article 12(2) RPBA and its admittance may thus be considered at the Board's discretion under Article 13(1) RPBA, such discretion being exercised *inter alia* in view of the complexity of the new

subject-matter submitted, the current state of the proceedings and the need for procedural economy.

16.1 The justification for submitting that objection at this stage of the proceedings was that the substantiation in relation to auxiliary request 6 had been submitted only one week before the oral proceedings with letter of 4 July 2018, including the indication that the only sensible reading of the passage in paragraph [0006] of the patent in suit reading "*Furthermore, addition of nucleators, potassium stearate or Milliken HPN-20E, reduce this standard deviation further and are therefore more preferred*" was that this passage related to the the invention underlying the patent in suit and not to the prior art. However, the essence of the argumentation on inventive step regarding auxiliary request 6 presented during the oral proceedings by the patent proprietor had already been submitted with its statement of grounds of appeal (passage bridging pages 8 and 9) and reiterated with letters of 2 November 2015 (page 12, last paragraph) and 4 July 2018, including the argument that there was no appreciation in the cited prior art that inclusion of a nucleator would result in the unexpected reduction in shrinkage variability. Under those conditions the misinterpretation by opponent 1 of the unambiguous (see point 13.2 above) passage in paragraph [0006] of the patent in suit even if it was first rebutted by the patent proprietor with letter of 4 July 2018 cannot justify the late submission of that new objection.

16.2 Since dealing with this new objection for which there was no appropriate justification would have necessitated adjournment of the oral proceedings in order to safeguard the parties' rights to fair proceedings, the Board in application of

Article 13(3) RPBA decided not to admit the inventive step objection starting from document D6 as closest prior art into the proceedings.

17. In the absence of any further objection against the subject-matter of auxiliary request 6, the Board concludes therefore that said request is allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of the claims of auxiliary request 6, filed as auxiliary request VI with the patent proprietor's statement of grounds of appeal, and after any necessary consequential amendment of the description.

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

M. Kiehl D. Semino

Decision electronically authenticated