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Datasheet for the decision of 5 December 2018

Case Number: T 0128/16 - 3.3.03

Application Number: 07816131.2

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Language of the proceedings: EN

Title of invention:
BARRIER FILM FOR FOOD PACKAGING

Patent Proprietor:
Nova Chemicals (International) S.A.

Opponent:
The Dow Chemical Company

Relevant legal provisions:
EPC Art. 123(2), 56
RPBA Art. 12(4), 13(1)

Keyword:
Late-filed evidence - admitted (no)
Amendments - allowable (yes)
Inventive step - (yes)

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Case Number: T 0128/16 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 5 December 2018

Appellant: (Opponent)	The Dow Chemical Company 2030 Dow Center Midland, MI 48674 (US)
Representative:	V.O. P.O. Box 87930 2508 DH Den Haag (NL)
Respondent: (Patent Proprietor)	Nova Chemicals (International) S.A. Avenue de la Gare 14 1700 Fribourg (CH)
Representative:	Watson, Robert James Mewburn Ellis LLP City Tower 40 Basinghall Street London EC2V 5DE (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 10 November 2015 concerning maintenance of the European Patent No. 2081990 in amended form.**

Composition of the Board:

Chairman	D. Semino
Members:	D. Marquis
	C. Brandt

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division posted on 10 November 2015 concerning the maintenance of European patent 2 081 990 in amended form.

II. The decision of the opposition division was based on a main request filed during the oral proceedings before the opposition division on 16 September 2015.

Claim 1 of the main request read:

"1. A barrier film comprising at least one extruded polyethylene layer, wherein said at least one extruded polyethylene layer comprises:
I) a nucleating agent, wherein said nucleating agent is a salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure and
II) a high density polyethylene blend composition comprising:
II-i) from 5 to 60 weight % of at least one high density polyethylene blend component a) having a high melt index, I_2; and
II-ii) from 95 to 40 weight % of at least one high density polyethylene blend component b) having a low melt index, I_2,
wherein:
v) the high density polyethylene blend composition comprises only components a) and b);
w) said nucleating agent is added in an amount of from 100 to 3000 parts per million based on the weight of said high density polyethylene blend composition;

x) each of said blend component a) and blend component b) has a density of from 0.950 to 0.975 g/cc;
y) the melt index, I_2, of said high density polyethylene blend composition is from 0.8 to 8 grams/10 minutes; and
z) the I_2 ratio, obtained by dividing the I_2 value of said blend component a) by the I_2 value of said blend component b) is greater than 10/1."

The following documents *inter alia* were cited during the opposition procedure:

D1: US-B-6 599 971
D3: WO-A-2005/090464
D4: Dolan, Milliken & Company, Nucleation of Polyethylene Blown Film, Presentation at 2006 PLACE Conference, 17-21 September 2006, Cincinatti, Ohio
D4a: Letter dated 25 August 2014 by K. Ledbetter regarding TAPPI PLACE conference of 2006
D5b: Plastics Additives & Compounding, July/August 2006, page 12
D5d: Plastics Technology, June 2006, What to see at NPE 2006: Chemicals and Additives
D5e: Food Contact Substance Notification FCN No. 608 (http://www.accessdata.fda.gov/scripts/fcn/fcnDetailNavigation.cfm?rpt=fcsListing&id=608)
D5g: http://web.archive.org/web/20060926010842/http://www.cfsan.fda.gov/~dms/opa-fcn.html, pages 1, 2, 49-51
D5h: Letter dated 29 April 2015 requesting a copy of FCN 608
D5i: Letter from Mrs. Baughan dated 30 January 2006
D5j: FDA Form 3480
D5k: Attachment 6 of form 3480
D5l: Memorandum dated 14 March 2006 of FDA
D5m: Letter dated 16 March 2006 of FDA

D5n: Letter dated 09 May 2006 of FDA
D6: Dolan, Milliken, Using Novel Additive Technologies to Improve the Barrier Properties of Polyolefin Films, Presentation at AMI Polyethylene Films Conference, December 2005
D6a: Letter dated 21 October 2014 by Mr. Reynolds regarding AMI Polyethylene Films Conference
D7: Todd, Equistar Chemicals, Variables that affect/ control high density polyethylene film oxygen/moisture barrier, Article presented at ANTEC 2003

D8: Experimental report of Mr Lin dated 5 December 2014 and filed by the opponent by letter of 10 December 2014
D9: Letter dated 14 July 2015 by Mr. Dotson

III. The contested decision of the opposition division can be summarized as follows:

(a) The amendments in claim 1 found a basis in the application as originally filed. The amendments in claim 8 found a support in the fact that the claimed process involved all compositional features of the product of claim 1.

(b) No objections of lack of sufficiency of disclosure or lack of novelty were raised against the main request. The requirements of sufficiency of disclosure and novelty were met.

(c) D3 represented the closest prior art. However, example 1 of D3 was not the starting point for the assessment of inventive step. The general teaching of D3 was that a film made from the composition according to claim 1 thereof had a water vapour transmission rate (WVTR) lower than 0.3 gmil/(100

in^2day).

(d) The problem to be solved according to the patent in suit was to further improve the WVTR of films made from high density polyethylene (HDPE) blends.

(e) The solution to this problem was, according to the patent in suit, the addition of a specific nucleating agent, i.e. the salt of a hexahydrophthalic dicarboxylic acid, and the use of a HDPE blend wherein the components had specific melt indices, a specific ratio of said melt indices and specific densities as defined in claim 1 of the patent.

(f) Examples 6 and 8 in table 1 of the patent showed lower WVTR values compared with compositions containing no nucleating agent or not satisfying the ratio of melt indices. In particular, the values measured for the layers of the patent were significantly lower than that given in example 1 of D3 (0.23 gmil/(100 in^2 day)).

(g) The results of D8 did not credibly show that the solution to the problem was an arbitrary selection not causally related to the solution of the stated problem.

(h) D3 was silent as to the choice of a ratio of melt indices of the components in the HDPE blend. The skilled worker would have had no incentive to calculate said ratio from the range of values for melt indices given in claim 1 of D3. In addition, not every combination of melt index and amount of component fell inside the claimed range of 0.8-8 g/

10 min for the melt index of the final blend.

(i) None of D3, D1, D5b, D5d, D6, D4/D4a and D7 rendered the solution to the problem obvious.

IV. The opponent (appellant) lodged an appeal against that decision. With the statement setting out the grounds of appeal, the appellant requested that the decision of the opposition division be set aside and that the patent be revoked. The following documents were cited with the statement setting out the grounds of appeal:

D5o: Abstract from Plastics and Rubber Weekly, 9 June 2006, page 9
D5p: PlasticsNet, A VertMarkets Marketplace for Industry Professionals, 5 May 2006
D5q: Milliken's Innovation Newsletter, 2006 (before 19 June)
D5r: Print of a message by e-mail sent 9 June 2006 by Mr Paul Trimble of Milliken to Mr Andy Chang of Dow with a cc to Mr Robin Lee of Dow
D5s: E-mail correspondence on D5r
D9a: Letter from Milliken on HPN-20E dated 4 December 2015
D10: Decision of the Appeal Board of the USPTO in Appeal case 2013-006801
D11: Decision of the U.S. District Court in E.I. DuPont de Nemours & Co versus Cetus Corp., 1990, U.S. Dist. LEXIS 18382 (N.D. Cal. Dec. 11, 1990)
D12: Food Safety Magazine October/November 2005 Regulatory Report: FDA's Food Contact Substance Notification Program (reprint).

V. In its reply to the statement of grounds of appeal, the patent proprietor (respondent) requested that the appeal be dismissed or that the patent be maintained on

the basis of the first to fourth auxiliary requests filed therewith.

VI. The following documents were additionally filed by the appellant with letter of 14 December 2016:

D9b: Signed statement by Mr. Brian Burton - Milliken
D13: US-A-2007 0 213 439
D14: US 60 780 296

VII. With letter of 15 December 2016, the appellant additionally filed D9c (Statement by Mr Brian Burton - Milliken dated 6 December 2016).

VIII. With letter of 21 March 2017, the respondent filed three additional requests as fifth to seventh auxiliary requests.

IX. 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.

X. With letter of 22 October 2018, the appellant filed the following documents:

D5t: Web archive of www.cfsan.fda.org/~dms/opa-fcn2.html dated 26 September 2006
D15: Declaration of Mr. Dotson dated 17 October 2018
D16: Analysis of Hyperform HPN®-20E dated 11 October 2018

XI. Oral proceedings were held on 5 December 2018.

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

follows:

Admittance of documents

(a) D10, Dl1 and D12 described the processing of submissions made in the course of a Food Contact Notification (FCN) at the United States Food and Drug Administration, as well as provided the Freedom Of Information Act (FOIA) describing the publication of documents filed at United States government institutions. These documents served to support and supplement the case as presented in the notice of opposition, and to evidence that the information provided about the notification FCN No. 608 was publically available at the priority date of the patent.

(b) D5o, D5p, D5q, and D9a further supported the fact that Milliken & Company was actively pushing and marketing its new product Hyperform® HPN-20E and was motivating the public to apply this new product as nucleating agent in polyethylene before the priority of the patent. This supplemented the case as presented in the notice of opposition with reference to D4/D4a, D5b-D5f and D6.

(c) D5r and D5s were e-mails filed in support of the fact that the products referred in the documents provided in the opposition as HPN-20E and EXP-20 actually corresponded to the product disclosed as FCN 608. This fact was already present in the notice of opposition.

(d) The documents filed with the statement setting out the grounds of appeal had therefore to be admitted into the proceedings as they merely reinforced the

line of attack already taken before the opposition division. It was established case law that additional evidence which simply backed up the arguments previously made without altering the legal framework and facts of the case in respect of the first-instance proceedings should be admitted into the proceedings.

(e) D13 and D14 further provided evidence that Milliken & Company had identified the commercial name and the chemical structure of Hyperform® HPN-20E as the calcium salt of 1,2-cyclohexanedicarboxylic acid, and furthermore disclosed that this compound was commercially sold as nucleating agent at the time of filing D14. D13 and D14 did not change the course of the appeal proceedings and merely supported the arguments already brought forward in the opposition proceedings thereby adding another perspective to the same facts to be proven. The filing of these documents was justified, because the respondent disputed the availability to the public of this information at the priority date of the patent despite the evidence already brought forward.

(f) D9 should be considered as proper evidence even if it was not a sworn statement. A further signed statement D9b and an additional declaration D9c in which Mr. Burton declared that Milliken & Company sent out information on Hyperform® HPN-20E to potential customers on a non-confidential basis was provided. These documents should be admitted into the appeal proceedings.

(g) D15, a sworn statement by Dr. Dotson from Milliken & Company, was filed in response to the

provisional opinion of the Board which questioned whether or not Hyperform® HPN-20E had been made publicly available before the priority date of the patent and whether it contained the calcium salt of 1,2-cyclohexanedicarboxylic acid. D15 was thus to be admitted into the proceedings.

(h) D5t represented the content of a document referred to in D5g as publically available on 26 September 2006 and was meant to fill a gap in the argumentation of the appellant.

(i) D16 was filed in support of the argument of the chemical composition of Hyperform® HPN-20E being available to the public other than through documentation as put forward in the statement setting out the grounds of appeal.

(j) D15, D5t and D16 were filed to fill gaps in the argumentation of the appellant concerning the commercial availability of the product Hyperform® HPN-20E and established that the composition of that product was publicly known before the priority date of the patent.

(k) The argument relating to the commercial availability of Hyperform® HPN-20E before the priority date of the patent was not new to the appeal proceedings but had already been raised before the opposition division. The documents provided were thus not filed in view of creating a fresh case in appeal. These documents should be admitted into the proceedings in spite of their late filing.

Main request

Amendments

(l) The amendment of the wording "an organic barrier nucleating agent" in "a nucleating agent, wherein said nucleating agent was a salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure [...]" in claims 1 and 8 of the main request was not supported by the application as originally filed. In particular, the application suggested that only certain cyclic dicarboxylic acids having an hexahydrophthalic acid structure were considered to be part of the invention. Since the claims of the main request did not contain such a limitation, they did not satisfy the requirements of Article 123(2) EPC.

(m) The combination of the product claims did not form a proper basis for the amendments performed in the process claim 8.

(n) Feature v) in claim 1 concerning the high density polyethylene composition comprising only components a) and b) that was added in the claims of the main request constituted a selection that had to be made in the description of the application as originally filed in order to arrive at the claimed subject matter. There was no basis for this selection in the application as originally filed.

(o) Amended claims 1 and 8 of the main request did not limit the upper amount of all organic barrier nucleating agents including the salts of a cyclic dicarhoxylic acid having a hexahydrophthalic structure in the extruded polyethylene layer.

Hence, organic barrier nucleating agents having an amount of more than 3000 parts per million based on the weight of the high density polyethylene blend composition were encompassed by the main request, contrary to the disclosure in the application as filed.

(p) Claim 5 of the main request listed melt index ranges for both components a) and b) for which the description as originally filed provided no basis. Since each of the ranges of melt index of both components a) and b) was only disclosed in combination with the requirement that the ratio of these melt indexes was greater than 10 in the application as originally filed, there was no support for the combination of ranges of melt index that did not also individually satisfy the condition relating to their ratio.

Inventive step

(q) Document D3 represented the closest prior art. Claim 1 of the main request differed from example 1 of D3 in the presence of a nucleating agent as defined in claim 1. The experimental data provided in D8 showed that the addition of a nucleating agent as defined in claim 1 of the main request did not necessarily lead to a decrease of water vapour transmission rate (WVTR) in barrier films based on polyethylene. In particular, a comparison of examples 2a, 2b and 2c of D8 suggested that the additional presence of zinc stearate in Hyperform® HPN-20E could in some instance be the main factor influencing the WVTR. Since claim 1 did not require the presence of zinc stearate, the problem posed in the patent in suit was thus not

shown to have been solved over the whole scope of the claims. Thus, the problem was the provision of an alternative barrier film.

(r) Even in case the problem was seen as the improvement of the closest prior art, the patent itself suggested in paragraphs 4 and 5 that the use of a nucleating agent was already known in the art. On that basis alone, claim 1 lacked an inventive step.

(s) Alternatively, the person skilled in the art would have consulted D4/D4a that related to polyethylene blown films and mentioned that water vapour migration could be beneficially influenced by changing the crystal size and orientation in polyethylene through nucleation. In particular, D4/D4a mentioned, in relation to food packages, that nucleation reduced the WVTR of films by an average of 39% in LLDPE and the WVTR in HDPE by approximately 12%. In that regard, the nucleating agent disclosed in D4/D4a was Hyperform® HPN-20E. That nucleating agent was commercially available before the priority date of the patent as shown in D4/D4a itself and in D5b and D5d. On that basis, the skilled person would have been motivated to use Hyperform® HPN-20E in the composition of D3. In order to arrive at the claimed subject matter, it was only necessary for the skilled person to have been in the position to analyse Hyperform® HPN-20E and identify its constituents, which the skilled person could have done.

(t) Alternatively, D5e and D9 established that Hyperform® HPN-20E was or contained a product falling within the genus "salt of a cyclic

dicarboxylic acid having a hexahydrophthalic structure" as defined in claim 1 of the main request. It was therefore obvious to use that salt in the compositions of D3 to solve the problem posed. With regard to the amount of nucleating agent, the skilled person would have arrived at the range according to claim 1 of the main request by mere routine experimentation.

(u) Additionally, D1 constituted a motivation for the person skilled in the art to use Hyperform® HPN-20E in polyethylene compositions such as those of D3. D1 also taught a typical amount for nucleating agents in thermoplastics (0.05 weight %) which was according to claim 1 of the main request. D5b further disclosed that Hyperform® HPN-20E nucleated polyethylene very well and significantly reduced moisture vapour transmission rates in LLDPE. D5b, moreover, mentioned that that product improved LDPE and HDPE as well. The claimed subject matter thus lacked an inventive step in view of D3 combined with D1 or with any of D5b, D5d, D5e, D5g and D5i to D5n, D6 or D9 showing that Milliken & Company was actively promoting its product Hyperform® HPN-20E on the market before the priority date of the patent.

XIII. The arguments of the respondent, as far as relevant to the present decision, can be summarised as follows:

Admittance of documents

(a) Documents D9a, D10-D12 and D5o-D5s provided with the statement setting out the grounds of appeal constituted fresh evidence that was not submitted in response to any actions of the respondent or of

the opposition division. These documents had only been filed to elaborate on issues based on uncorroborated facts that had been raised earlier before the opposition division. These documents were thus late filed and should not be admitted into the proceedings.

(b) More specifically, D9a was an unspecific declaration regarding alleged shipments of Hyperform® HPN-20E. That document however failed to provide any verifiable facts in that regard. D10 and D11 concerned the public availability of documents that were of no relevance to the FDA records of the present case. As to D12, it was unclear whether its publication date was before the priority date of the patent so that it could not be concluded that that document was relevant either. D5o to D5q were not relevant to the question posed as they did not disclose the composition of Hyperform® HPN-20E. D5r and D5s related to e-mails between an employee of Milliken & Company and an employee of Dow. Since these e-mails were clearly of a confidential nature, their contents could not be used in the present case. All these documents failed to establish that the identity of the product Hyperform® HPN-20E was known to the public before the priority date of the patent. These documents should not be admitted into the proceedings.

(c) D9b, D9c, D13 and D14 were filed after the statement setting out the grounds of appeal. These documents failed to establish the identity of Hyperform® HPN-20E. In particular, D9b and D9c did not provide evidence of the alleged non-confidential disclosure of the product and failed

to give a specific date for that disclosure either. D13 and D14 were patent documents mentioning that Hyperform® HPN-20E was commercially available at some point but it could be doubted that that information in D13 and D14 was accurate. No evidence was provided that would corroborate D13 and D14. Under these circumstances, D9b, D9c, D13 and D14 should not be admitted into the proceedings.

(d) The use of any of the documents submitted in appeal in order to establish that Hyperform® HPN-20E had been made commercially available at the priority date of the patent was new to the proceedings and constituted a change of case. That was in particular true for D5t, D15 and D16 which were filed at a very late stage of the proceedings. Also, the content of D5t was unclear. D15 did not offer more information on Hyperform® HPN-20E than was already on file. As to the alleged shipments of that product to multiple customers made in D15, no verifiable evidence was provided. These documents should not be admitted into the proceedings.

Amendments

(e) Claim 1 of the main request was based on the wording of claims 1, 6, 8 and 9 of the application as originally filed. As to the limitation of the high density polyethylene composition to the components a) and b) only in claim 1, it finds a basis in the description of the application as originally filed which makes clear that the blend contains a) in an amount of 5-60 weight% whereby b) forms the balance of the total polyethylene.

(f) The wording of claim 1 as granted did not allow for the presence of a nucleating agent as defined in that claim that was comprised in an amount of more than 3000 ppm. The definition of the nucleating agent in claim 1 as granted did thus not contravene the requirements of Article 123(2) EPC.

(g) Since the product and process aspects disclosed in the application as originally filed were clearly unified and the features described in the context of the barrier film product were understood by the skilled person to be equally applicable to the process of making that same barrier film, the modification of the process claim 8 did not infringe Article 123(2) EPC.

(h) The ranges defining the melt indices of components a) and b) of the composition of claim 5 as granted were not mutually exclusive according to the application as originally filed. Since the ranges of melt indices define two of the essential components of the composition, their combination did not infringe Article 123(2) EPC.

(i) As no further limitation was added to that claim, its subject matter was fully supported by the wording of the claims as originally filed.

Inventive step

(j) D3 and in particular its example 1 represented the closest prior art. The claimed subject matter was characterized by the density of the blend component b), which was in the range of 0.95 to 0.975 g/cc and in that a nucleating agent as defined in

claim 1 of the main request was used.

(k) The examples of the patent in suit showed that the nucleating agent according to claim 1 resulted in barrier films having decreased WVTR. D8 contained a series of examples 2a to 2c which appeared to contradict the results reported in the patent in suit. That discrepancy could be explained by an insufficient dispersion of the nucleating agent in the polyethylene blend. That series of examples was thus not relevant.

(l) The problem that was solved in the patent in suit was to improve the WVTR of barrier films of the polyethylene layers.

(m) D4/D4a referred to Hyperform® HPN-20E as a nucleating agent that would solve the problem posed but it had not been established that Hyperform® HPN-20E was commercially available nor that its composition was known publicly before priority. The statement about the composition of Hyperform® HPN-20E made in D9 was unsupported. That document did not constitute an evidence of a public prior use of Hyperform® HPN-20E. The skilled person did therefore not find a hint in the prior art that could have led him to use a calcium salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure as a nucleating agent in the claimed barrier films. Claim 1 of the main request was therefore inventive over D3.

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

XV. The respondent requested that the appeal be dismissed or that the patent be maintained on the basis of the first to fourth auxiliary requests submitted with the reply to the statement setting out the grounds of appeal or on the basis of the fifth to seventh auxiliary requests filed with letter of 21 March 2017.

Reasons for the Decision

1. Admittance of documents

1.1 Documents D10-D12, D9a, D5o-D5s were filed with the statement setting out the grounds of appeal to support the argument that the product Hyperform® HPN-20E had been made commercially available and that its composition was publicly available before the priority date of the patent (statement setting out the grounds of appeal, page 3, lines 11-12). While these documents have been filed with the statement setting out the grounds of appeal, the Board has the power to hold them inadmissible under Article 12(4) RPBA.

1.1.1 D10-D12 were filed according to the appellant in reply to the decision of the opposition division not to take the documents D5i-D5n into account on the grounds that these documents had not been shown to have been made publicly available before the priority date of the patent in suit (statement setting out the grounds of appeal, page 10, lines 5-28). In that respect, the reasoning provided by the opposition division in its contested decision was that D5i-D5n did not explicitly disclose a date of public availability that was unambiguously before the priority date of the patent (page 3 of the decision).

1.1.2 The point concerning the lack of evidence of public availability of the information regarding Hyperform® HPN-20E as such and the registration FCN 608 at the FDA addressed with D5i-D5n is however not an issue that arose first from the decision of the opposition division. Indeed, documents D5i-D5n had themselves been filed by the opponent with letter of 22 May 2015 in reply to an objection of the patent proprietor that documents D5e and D5f, upon which the notice of opposition was based, were not shown to have been published before the priority date of the patent. The issue regarding the lack of evidence of public availability of the information contained in the documents provided in the notice of opposition was thus known to the opponent all along, from the beginning of the opposition procedure (page 2 of the reply of the proprietor dated 27 August 2013) and was also addressed by the opposition division in its summons to oral proceedings (summons of 12 May 2014). Moreover, it is the duty of the opponent to provide all relevant information regarding public availability, in particular in case of a market product, as early as possible in opposition proceedings.

1.1.3 It is apparent to the Board that the objection regarding the public availability of the information contained in D5i-D5n could and should have been addressed by the then opponent by submitting the necessary evidence as early as possible before the opposition division. This is all the more the case as D10-D12 were already available online to the opponent during the opposition procedure. There is therefore no justification for having filed D10-D12 first in the appeal procedure. These documents are therefore not admitted into the proceedings.

1.1.4 D9a was filed by the appellant as new evidence (statement setting out the grounds of appeal, page 28, lines 16-19). D9a is a statement of an employee of Milliken & Company alleging that Hyperform® HPN-20E was promoted to the public in the second quarter of 2006 and disclosing that samples of that product had been sent to potential customers as early as in April 2006. No reason was provided as to why D9a was first filed in appeal and the Board sees no reason why D9a could not have been filed earlier before the opposition division. Besides being filed late, the appellant did not establish that D9a was particularly relevant as it does not contain any substantiation of the facts and dates mentioned therein. D9a is thus not admitted into the proceedings.

1.1.5 D5o-D5s were filed in appeal in order to establish that the product Hyperform® HPN-20E was commercially available before the priority date of the patent (statement setting out the grounds of appeal, pages 26 and 27).

1.1.6 D5o, D5p and D5q are articles reporting on Hyperform® HPN-20E in very general terms and there is no explicit disclosure in these documents of the commercial availability of Hyperform® HPN-20E at any specific date, nor of its composition. These documents, besides being late filed, were not shown in the statement setting out the grounds of appeal to be prima facie relevant. These documents are therefore not admitted into the proceedings.

1.1.7 D5r and D5s relate to an e-mail dated 6 September 2006 between an employee of Milliken & Company and an employee of Dow. It is immediately apparent that neither D5r nor D5s contains an explicit date regarding

the commercial availability of Hyperform® HPN-20E or the publication of the composition of that product by the FDA following the filing of the Food Contact Notification reported therein. Also, no reason was provided as to why these documents, which were directly available from the appellant, could not have been provided earlier before the opposition division. The mere assertion that these documents were filed to fill gaps in the argumentation of the opponent does not suffice to explain their late filing. These documents are not admitted into the proceedings.

1.2 Further documents were submitted by the appellant later in appeal (D9b, D9c, D13 and D14) and even after the communication of the Board in preparation to the oral proceedings (D5t, D15 and D16). No reason was provided as to why these documents could only be filed so late into the appeal and the Board sees no change in the proceedings that could justify the filing of these documents in reaction at such a late stage either. Moreover, the piecemeal filing of a large number of documents concerning a single issue which was critical since the start of the opposition proceedings is contrary to the principle of procedural economy and also contrary to the fairness of the proceedings. On this basis, D9b, D9c, D13, D14, D5t, D15 and D16 are not admitted into the proceedings (Article 13(1) RPBA).

1.3 In conclusion, none of the documents D10, D11, D12, D13, D14, D15, D16, D5o, D5p, D5q, D5r, D5s, D5t, D9a, D9b and D9c submitted during the appeal are admitted into the proceedings.

2. Amendments

2.1 Claim 1 of the main request differs from claim 1 of the application as originally filed:

(i) in the amendment of component I of the extruded polyethylene layer which was defined as an "organic barrier nucleating agent" in claim 1 of the application as originally filed and was replaced by "a nucleating agent, wherein said nucleating agent is a salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure" in claim 1 of the main request,

(ii) in the addition that the blend only comprises components a) and b), and

(iii) in the range defining the melt index of the high density blend composition which was amended from "0.5 to 10 g/10 min" to "0.8 to 8 g/10 min".

2.2 The definition of component I as amended in claim 1 of the main request corresponds to the definition provided in claims 8 and 9 dependent of claim 1 as originally filed. While it is correct that the reference to the nucleating agent being an "organic barrier" nucleating agent in claim 1 as originally filed was removed from the definition of component I in claim 1 of the main request, it is immediately evident to the skilled reader that the definition of the nucleating agent in claim 1 of the main request by its name "salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure" implies that that component is organic in nature, thereby rendering the mention of it being "organic" superfluous. As to the removal of the reference to a "barrier", it is also implicit from

claims 8 and 9 of the application as originally filed that these compounds were as such "barrier" nucleating agents as this can be derived from the passage on page 8, lines 24-30 of the application as originally filed by reference to the nucleating agents of the invention. In conclusion, it is clear to the skilled reader from the application as originally filed that the nucleating agents as now defined in claim 1 of the main request are organic barrier nucleating agents per se. The omission of the mention in claim 1 of the main request that these nucleating agents are "organic barrier" nucleating agents therefore does not infringe Article 123(2) EPC.

2.3 With respect to the objection raised by the appellant in view of the numerical range defining the amount of nucleating agent according to claim 1 of the main request (pages 6 and 7 of the statement setting out the grounds of appeal), it is sufficient to note that that numerical range of 100 to 3000 parts per million based on the weight of said high density polyethylene blend composition was already present in claim 1 of the application as originally filed and that that limitation necessarily applied to all its dependent claims, including claims 8 and 9 which defined the specific nucleating agent now limiting claim 1 of the main request. Since it is the subject matter of claims 8 and 9 as originally filed which forms part of the definition of the nucleating agent in claim 1 of the main request, the Board does not find that the requirements of Article 123(2) EPC are infringed in that respect.

2.4 With regard to amendment (ii), the application as originally filed provides a support for the a high density polyethylene blend composition comprising only

components a) and b). The blend components a) and b) of the claimed composition are disclosed in the sections on pages 5 and 6 of the application as originally filed. In the passage on page 5, lines 23-29 in particular, the blend component a) of the high density polyethylene blend composition is defined as having a density of from 0.950 to 0.975 g/cc and as being comprised in the blend composition in an amount of from 5 to 60 weight %. With respect to the definition of the amount of the blend component a), that passage further specifies that that amount is relative to the total HDPE composition "with blend component b) forming the balance of the total polyethylene", implying that the blend components a) and b) are the only components of the polyethylene blend composition. Amendment (ii) listed above therefore does not infringe Article 123(2) EPC.

2.5 As to amendment (iii), claim 6 of the application as originally filed provides the same wording and the same range of melt index as that defining claim 1 of the main request. That amendment is therefore also allowable under Article 123(2) EPC.

2.6 It can be concluded from the above that claim 1 of the main request corresponds to the subject matter of claims 9, 8 and 6 dependent on claim 1 of the application as originally filed, further limited by the mention that the high density polyethylene blend composition comprises only components a) and b) on the basis of the general definition of the amount in blend components a) and b) found on page 5 of the description as originally filed. In that respect, the combination of the amended features (i), (ii) and (iii) finds a basis in the application as originally filed.

2.7 Further objections were made against claims 5 and 8 of the main request.

2.7.1 The ranges defining the melt indices of both blend component a) (greater than 5 grams/10 minutes) and blend component b) (from 0.1 to 2 grams/10 minutes) in claim 5 of the main request are based on individual disclosures of preferred ranges of melt indices according to page 5, lines 16 and 17 and page 6, lines 17 and 18 of the application as originally filed. As argued by the respondent, each of these ranges were disclosed individually with the condition that the melt index of blend component a) is at least 10 times greater than the melt index of blend component b) in the application as originally filed. That condition on the ratio of melt indices of the blend components a) and b) (condition z) is also present in claim 1 of the main request. The combination of both ranges of melt indices for the blend components a) and b) in dependent claim 5 of the main request must be read in the context of claim 1 from which claim 5 depends. The limitation of the ratio of melt indices in claim 1 thus applies to the combination of melt indices as defined in claim 5. The combination of melt indices defined in claim 5 is thereby more limited than each individual disclosures of melt indices of the application as originally filed. Also, since these ranges are defined as being preferred ranges in the application as originally filed and they concern components disclosed in combination with one another in claim 1 as originally filed, the combination of these ranges does not infringe Article 123(2) EPC.

2.7.2 As to claim 8 of the main request, it corresponds to the process of claim 11 as originally filed in which the barrier film involved in the process was further adapted in accordance to the amendments performed in

claim 1 of the main request. The Board does not see why the product claims of the application as originally filed, which concerned the same product as that defined in claim 11 as originally filed could not be considered as a basis for the amendments performed in claim 8 of the main request, the whole original application concerning a barrier film (a product) together with its method of production by extrusion.

2.8 The Board concludes that the main request satisfies the requirements of Article 123(2) EPC.

3. Inventive step

3.1 The patent in suit concerns barrier films prepared from a blend of at least two high density polyethylene (HDPE) resins and a nucleating agent that can be used in food packaging (paragraph 1). The object of the patent in suit is to provide films with barrier properties and in particular with lower water vapour transmission rate (WVTR) (paragraph 19).

3.2 The contested decision in view of inventive step is based on document D3 as closest prior art. D3 discloses a film comprising at least one layer made from a polymer composition comprising 35-65 weight % of an ethylene polymer having a density of ≥ 0.94 g/cm^3 and a melt index of 0.001-1 g/10 min together with 35-65 weight % of an ethylene polymer having a density ≥ 0.94 g/cm^3 and a melt index of 50-700 g/10 min (claim 1). The WVTR performance of these films is an object of D3 (page 2, lines 5-8).

3.3 At the oral proceedings before the Board, example 1 in D3 was seen by the parties as the starting point to assess inventive step. As to that example, the

opposition division came to the conclusion in its decision that it could not be seen as a reasonable starting point on the grounds that that example could not be seen as representing the teaching of D3 since the melt index of the second component of the blend was outside the range disclosed in claim 1 of D3. It is however unclear how the opposition division came to that conclusion since the value of the melt index of the second component is not given in D3 and it does not appear to be derivable from the data provided in a straightforward manner either. In that regard, neither the parties nor the Board were in the position to find a basis for the determination of the melt index of the second component of the blend of example 1. In fact, it was not in dispute between both parties in appeal that the composition of example 1 represented the teaching of D3. The Board, in agreement with the parties, comes therefore to the conclusion that the composition of example 1 of D3 can be considered as a reasonable starting point for the problem solution approach.

3.4 It was accepted by both parties at the oral proceedings before the Board that the barrier film according to claim 1 of the main request differed from the barrier film of example 1 of D3 in the use of a nucleating agent in the polyethylene blend composition and in the density of the second polyethylene component of the blend. As the conclusion is reached that an inventive step is acknowledged, it is irrelevant to ascertain whether further differences are present.

3.5 The patent in suit contains examples and comparative examples describing the preparation of films from polyethylene compositions with a nucleating agent according to claim 1 of the main request and films based on the same polyethylene compositions but without

nucleating agent. In particular, the barrier films produced from the two polyethylene compositions of examples 6 and 8 containing 1000 ppm of the calcium salt of 1,2-cyclohexanedicarboxylic acid as nucleating agent (paragraph 63) showed a lower water vapour transmission rate (0.1525 g/100 in^2/day and 0.0749 g/100 in^2/day, respectively) than the barrier films of examples 5-c and 7-c which were based on the same polyethylene compositions but which did not contain a nucleating agent (0.1955 g/100 in^2/day and 0.1594 g/100 in^2/day, respectively). The examples of the patent in suit thus show a decrease of WVTR caused by the presence of the claimed nucleating agent according to claim 1.

3.6 The appellant argued on the basis of D8 that an improvement of WVTR was not present over the whole scope of claim 1 of the main request. In particular, it was argued that D8 showed that the ranges defining the ratio of melt indices of the blend components a) and b), the amounts of a) and b), and even the required presence of two blend components defining the composition of claim 1 of the main request had been chosen arbitrarily since none of these features were shown to influence the WVTR in the compositions of examples 3a, 3b, 4a, 4b and 6a, 6b reported in Table 2 of D8. However, the fact that one or more features defining claim 1 of the main request do not contribute to the WVTR over the closest prior art do not necessarily mean that these features have been chosen arbitrarily to define the claimed subject matter. It only means the alleged improvement in WVTR cannot be directly attributed to these features. That was also not disputed by the respondent. In that respect, the respondent only attributed the improvement of WVTR to the specific type of nucleating agent defined in

claim 1 of the main request which does not constitute a distinguishing feature over the closest prior art.

3.7 The appellant also argued on the basis of the WVTR measurements performed on the films of examples 2a, 2b and 2c in D8 that it was not the calcium salt salt of 1,2-cyclohexanedicarboxylic acid but the presence of zinc stearate in the nucleating agent that caused an improvement of WVTR. In that regard, the respondent indicated that, since the nucleating agent added in the composition of example 2c was a masterbatch containing 15% of calcium salt salt of 1,2-cyclohexanedicarboxylic acid and as much as 85% of HDPE wax (paragraph 1 on page 2 of D8), the unexpectedly high WVTR value of films containing that nucleating agent could be attributed to the presence of HDPE wax which could have resulted in an insufficient dispersion of the nucleating agent in the polyethylene blend composition. That argument of the respondent, which was not rebuked by the appellant, is credible in view of the passage of paragraph 49 of the patent in suit which mentions the need for a good dispersion of the nucleating agent in the composition. Under these circumstances, the Board cannot draw any conclusion on the effect of the specific nucleating agent based on examples 2a, 2b and 2c of D8.

3.8 With respect to the density of the second polyethylene blend component which is not disclosed in example 1 of D3, the data made available on file in appeal does not establish the presence of a specific effect over the composition of the closest prior art. Since no effect has been established that can be attributed to that distinguishing feature, it cannot be taken into account when formulating the technical problem.

3.9 It is concluded from the above that the problem solved over the closest prior art is the provision of a barrier film with lower water vapour transmission rate (WVTR). The solution to that problem is the use of a salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure according to claim 1 of the main request.

3.10 It remains to be determined whether the claimed subject matter was obvious to a person skilled in the art starting from the closest prior art D3. The question posed in that respect is whether the skilled person would have used a salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure in order to lower the water vapour transmission rate of barrier films based on polyethylene blends. Documents D4/D4a, D5b, D5d, D5e, D9, D1, D5i to D5n and D6 were cited by the parties in that regard.

3.11 D4/D4a is a group of three documents comprising:

(a) a technical paper titled "Nucleation of Polyethylene Blown Film" said to have been prepared and presented by Mrs. Dolan from Milliken & Company at the 2006 PLACE conference in Cincinnati, Ohio, on 17-21 September 2006,

(b) a copy of 35 slides titled "Nucleation of Polyethylene Blown Film" dated from 17-21 September 2006 and said to have been presented by Mrs. Dolan from Milliken & Company at that conference,

(c) a letter from Mrs. Ledbetter of TAPPI addressed to Mr. Bongartz of Dow Europe GmbH stating that the technical paper (a) was presented at the 2006 TAPPI PLACE Conference held on 17-21 September 2006 at

the Hyatt Regency Hotel in Cincinnati, Ohio, USA and that this technical paper was available to all attendees on the conference proceedings CD which was distributed at the conference.

3.12 Both technical paper and slides concern the nucleation of polyethylene blown films and the effect of nucleation on WVTR of polyethylene films. It is mentioned on page 2 of the technical paper (a) and on slide 33 (b) that nucleation, in the field of polyethylene flexible packaging, reduces the WVTR of LLDPE based films by an average of 39% and of HDPE based films by approximately 12%. None of the documents contained in D4/D4a mentions a salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure. It was however held by the opponent that D4/D4a taught in several instances the use of a product disclosed under the name Hyperform® HPN-20E as a nucleating agent.

3.13 The technical paper (a) indeed mentions in its introduction that Milliken & Company specifically developed a new nucleating agent for polyethylene called Hyperform® HPN-20E. The same product is mentioned in slides 19 "A novel nucleator Hyperform HPN-20E, has been introduced to the market [...]" and 28 "Processing window with Hyperform HPN-20E" of the presentation (b), albeit without identifying the product any further by way of its chemical name or structure. On that basis, it cannot be concluded that Hyperform® HPN-20E is or contains a salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure according to claim 1 of the main request. Furthermore, while the documents of D4/D4a suggest that Hyperform® HPN-20E was "introduced" to the market, they do not explicitly disclose that that product was effectively

commercially available at any point before the priority date of the patent in suit (17 November 2006). In that respect, the mention of the introduction of the product to the market in D4/D4a, since it may also refer to its promotion to the public without actual sell or disclosure of its composition, cannot be seen as evidence of its commercial availability.

3.14 Documents D5b and D5d, dated from July/August and June 2006 respectively, analogously refer to the development of Hyperform® HPN-20E as a new nucleating agent for polyethylene but as far as the use of the product is concerned, these document only report general properties of the product advertised by Milliken & Company and do not establish that that product was effectively sold. That is also true for the passage at the end of the third column of D5b, "Our customers are surprised that an additive can nucleate polyethylene so well", as it does not specify that these customers have actually obtained the product.

3.15 None of the other documents cited by the appellant in that context, D5e, D9, D5i to D5n and D6, provide further evidence of the commercial availability of Hyperform® HPN-20E before the priority date of the patent in suit.

3.15.1 In particular, D5e is a Food Contact Notification No. 608 of Milliken Chemical concerning the calcium salt of 1,2-cyclohexanedicarboxylic acid with CAS Reg. No. 491589-22-1. That document does not mention Hyperform® HPN-20E. It was also not shown that D5e had effectively been published before the priority date of the patent. In particular, D5e is a printout of a website dated 11 January 2013, after the priority date of the patent. D5e contains a reference to an effective date of

6 June 2006, it was however not established beyond reasonable doubt what that effective date was referring to. D5e can therefore not answer the question of the commercial availability of Hyperform® HPN-20E before the priority date of the patent.

3.15.2 D9 is a letter from Dr. Dotson of Milliken & Company dated 14 July 2015 stating that EXP-20, EXP and HPN-20E were based on the same nucleating agent, namely the calcium salt of 1,2-cyclohexanedicarboxylic acid. That statement is however not supported by any factual evidence showing that that was effectively so and it does also not establish that the composition of Hyperform® HPN-20E was known to the public before the priority date of the patent.

3.15.3 D5i is a letter mentioning the calcium salt of 1,2-cyclohexandicarboxylic acid to be used as a nucleating agent at a level not exceeding 2500ppm. That document does not mention Hyperform® HPN-20E.

3.15.4 D5j and D5k disclose that FCN No. 608 concerns the product of CAS registry number 491589-22-1, known as the calcium salt of cis- 1,2-cyclohexanedicarboxylic acid. There is no reference to Hyperform® HPN-20E in D5j and D5k either. Similarly, D5l, D5m, D5n are all document referring to FCN 608 but not to Hyperform® HPN-20E.

3.16 In conclusion, the Board finds no evidence in these documents that Hyperform® HPN-20E was commercially available or that its composition was known to the public before the priority date of the patent. As a consequence, the documents of D4/D4a cannot be seen as providing the proposed solution to the problem posed.

3.17 Additionally, the appellant considered that the teaching of any of D1, D5b, D5d, D5e, D5g and D5i to D5n, D6 and D9 for themselves provided the proposed solution to the problem posed in view of the closest prior art D3, namely that of providing of a barrier film with lower water vapour transmission rate (WVTR).

3.17.1 D1 relates to compounds and compositions comprising specific metal salts of hexahydrophthalic acid as nucleating and/or clarifying agents in order to provide highly desirable properties within thermoplastic articles (column 1, lines 8-22). D1, however, does not concern films of HDPE resins nor does it contain a teaching relating to WVTR properties in films. The Board finds that the teaching of D1 would thus not have been consulted by a skilled person starting from D3 and wishing to solve the problem posed.

3.17.2 While D5b and D5d teach the use of Hyperform® HPN-20E as nucleating agent to improve the moisture barrier performance of polyethylene, they do not go beyond the teaching of D4/D4a so that they also do not provide the proposed solution to the posed problem.

3.17.3 Alternatively, both D5e and D9 were cited as documents teaching the use of the calcium salt of 1,2-cyclohexanedicarboxylic acid as nucleating agent. However, since it has not been established that the information relating to the calcium salt of 1,2-cyclohexanedicarboxylic acid contained in D5e and D9 was available to the public before the priority date of the patent, these documents cannot be seen as providing the required solution to the posed problem.

3.17.4 D5g is a reprint of a web archive dated form 26 September 2006 concerning the inventory of effective

food contact substances. The compound number 608 on page 3 of D5g is the calcium salt of 1,2-cyclohexanedicarboxylic acid and is identified as a nucleating or clarifying agent. There is however in D5g mo mention of polyethylene films and no teaching of the effect of this compound on the WVTR properties of polyethylene films. It has also not been established that that product corresponded to Hyperform® HPN-20E taught in D4/D4a. There was thus no reason for the skilled person to consider D5g to solve the problem posed. The same essentially applies to the documents D5i to D5n, which relate to the FDA notification concerning the same compound but which do not concern the WVTR properties of polyethylene films.

3.17.5 D6 is a presentation of Milliken & Company dated December 2005 that is similar to the presentation (b) contained in D4/D4a to the extent that D6 concerns the improvement of the WVTR properties of polyethylene films through the use of a nucleating agent in the polyethylene composition. In particular, sheets 16-18 of D6 disclose that an additive referred to as "EXP" provided improved vapour barrier performance in films. That document however does not identify the additive "EXP" in any way. There is therefore no indication from D6 that that additive would correspond to the solution provided in the patent in suit, namely the salt of a cyclic dicarboxylic acid having a hexahydrophthalic structure according to claim 1 of the main request. Since the statement in D9 relating to the identity of "EXP" being the calcium salt of 1,2-cyclohexandicarboxylic acid was not substantiated by any fact, it cannot be relevant. As to D6, the reference to a FDA compliance on slide 30 alone does not as such establish that EXP was known to the public as a salt of a cyclic dicarboxylic acid having a

hexahydrophthalic structure as defined in claim 1 of the main request. Under these circumstances also, D6 does not provide the proposed solution to the posed problem.

3.18 Further inventive steps attacks were made on the basis of D4/D4a and D6 as documents of the closest prior art. The question in view of these attacks is whether D4/D4a or D6 constitutes a reasonable starting point for an assessment of inventive of step of claim 1 of the main request. Both D4/D4a and D6 address the nucleation of polyethylene films with view of improving their barrier resistance(D4/D4a: page 2, last but one paragraph and D6: Slides 15 to 22). With regard to the polyethylene film composition however, D4/D4a and D6 relate to LLDPE, LDPE and HDPE polyethylenes (D4/D4a: page 1, Table 1 and page 2, last but one paragraph and D6: Slides 11, 17, 18 and 21) that are not blends of HDPEs having different melt indices, as it is the case in claim 1 of the main request and in D3 (claim 1). Since that feature is essential to the definition of the type of composition defined in claim 1 (paragraphs 6 and 35 of the patent in suit), none of D4/D4a or D6 can be seen as a reasonable starting point for the assessment of inventive step.

3.19 The Board concludes that none of the documents forming part of the appeal proceedings renders the solution disclosed in claim 1 of the main request obvious in view of the closest prior art D3. The same conclusion applies to the process claim 8 of the main request which is based on the same composition and nucleating agent as defined in claim 1. The claims of the main request thus satisfy the requirements of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. ter Heijden D. Semino

Decision electronically authenticated