Internal distribution code:

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

Datasheet for the decision of 14 October 2022

Case Number: T 3098/19 - 3.3.03

Application Number: 11794148.4

Publication Number: 2649130

IPC: C08L77/02

Language of the proceedings: EN

Title of invention:
LINER FOR GAS STORAGE TANK

Patent Proprietor:
DSM IP Assets B.V.

Opponents:
LANXESS Deutschland GmbH
RPE GmbH
Toray Industries, Inc.

Relevant legal provisions:
EPC R. 139
RPBA 2020 Art. 12(6)
EPC Art. 54, 111(1), 56

Keyword:
Correction of error in debit order (yes)
Admittance of documents
Novelty - Main Request (yes)
Inventive step - Main Request and Auxiliary requests I-VII (no)

Decisions cited:
G 0001/12, J 0003/01, J 0008/19, T 2620/18, T 3029/18, T 0317/19, T 1000/19, T 0444/20

Europäisches Patentamt
European Patent Office
Office européen des brevets

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 3098/19 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 14 October 2022

Appellant: (Patent Proprietor)	DSM IP Assets B.V. Het Overloon 1 6411 TE Heerlen (NL)
Representative:	DSM Intellectual Property P.O. Box 4 6100 AA Echt (NL)
Respondent I: (Opponent 1)	LANXESS Deutschland GmbH Kennedyplatz 1 50569 Köln (DE)
Respondent II: (Opponent 2)	RPE GmbH Bergstr. 30c 54329 Konz (DE)
Representative:	Hartz, Nikolai Wächtershäuser & Hartz Patentanwaltspartnerschaft mbB Weinstrasse 8 80333 München (DE)
Respondent III: (Opponent 3)	Toray Industries, Inc. 2-1, Nihonbashi-Muromachi 2-chome, Chuo-ku Tokyo 103-8666 (JP)
Representative:	Mewburn Ellis LLP Aurora Building Counterslip Bristol BS1 6BX (GB)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 25 September 2019 revoking European patent No. 2649130 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

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

Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division revoking European patent No. 2 649 130.

II. The following documents were *inter alia* cited in the opposition procedure:

D2a: US 2003/0092822 A1
D4: US 5 741 601
D6: US 2009/0203845 A1
D25: Inoue, M., Nucleating effect on the kinetics of crystallization and the spherulites of nylon 6. J. Polym. Sci. A, Vol. 1, pages 2013-2020 (1963)
D29: US 2002/0007021 A1
D41: Experimental Results filed as D10R by opponent 2 on 4 June 2019
D43: Wikipedia, Definition of "Hydrogen tank"
D45: Plot of examples of patent and examples of D6 submitted by the patent proprietor at the oral proceedings before the opposition division (Annex D of the contested decision)

III. As far as it is relevant to the present case the decision of the opposition division can be summarized as follows:

- D41 was admitted into the proceedings.

- Claim 1 of the main request was not novel over D6.

- Claim 1 of auxiliary request I lacked an inventive step starting from D6 as the closest prior art. The

same conclusion applied to claim 1 according to auxiliary requests III-XIV.

- Auxiliary requests II and XV to XIX were not admitted into the proceedings.

IV. The patent proprietor (appellant) lodged an appeal against the decision of the opposition division and filed the following documents with their statement of grounds of appeal:

D46: Supplementary experimental results
D47: Extract of Material Data Center Datasheet of UBE Nylon 5034 B - PA666 - UBE

V. With letter dated 28 June 2021 opponent 2 (respondent II) submitted documents D48 and D49 as follows:

D48: JP 2010-90938 A
D49: US 2010/0126999 A1

VI. The parties were summoned to oral proceedings and a communication pursuant to Article 15(1) RPBA 2020 indicating specific issues to be discussed at the oral proceedings was sent to the parties.

VII. With letter of 20 May 2022 the appellant submitted seven sets of claims as auxiliary requests I to VII, which corresponded to previous requests reordered and renumbered.

VIII. Oral proceedings were held on 14 October 2022 with only the appellant attending.

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

(a) The appellant requested correction of the debit order for the appeal fee and requested that the decision under appeal be set aside and the case be remitted to the opposition division for further prosecution on the basis of the main request or, in the alternative, that the patent be maintained on the basis of any of auxiliary requests I to VII, all requests as provided by letter of 20 May 2022.

(b) Respondent I (opponent 1) and respondent II (opponent 2) requested that the appeal be deemed not to have been filed or, in the alternative, that it be dismissed. Respondent III (opponent 3) requested that the appeal be dismissed.

Claim 1 of the main request read as follows:

"1. Gas storage tank, comprising a liner and a structural fiber composite comprising continuous carbon or glass fibers, wherein the liner is a liner for a gas storage tank containing a polymer composition comprising:

i. a polyamide A, and
ii. a nucleating agent in an amount of at least 0.001 weight percent with respect to the total amount of the polymer composition, and
iii. an impact modifier in an amount of at least 1 weight percent with respect to the total amount of the polymer composition,
wherein the liner is prepared by blow molding or injection molding".

Claim 1 of auxiliary request I differed from claim 1 of the main request in that the nucleating agent was micro

talcum.

Claim 1 of auxiliary request II differed from claim 1 of the main request in that the amount of nucleating agent was at most 0.15 wt.-%.

Claim 1 of auxiliary request III differed from claim 1 of auxiliary request II in that the nucleating agent was selected from micro talcum, carbon black, silica, "titane [*sic*]" dioxide, and nano-clay.

Claim 1 of auxiliary request IV differed from claim 1 of auxiliary request III in that the nucleating agent was micro talcum.

Claim 1 of auxiliary request V differed from claim 1 of auxiliary request III in that the polyamide A was selected from PA6, PA66 and blends thereof.

Claim 1 of auxiliary request VI differed from claim 1 of auxiliary request V in that the polyamide A was PA6 and the impact modifier was an ethylene/propylene copolymer functionalized with anhydride groups.

Claim 1 of auxiliary request VII differed from claim 1 of auxiliary request VI in that the nucleating agent was micro talcum.

X. The appellant's arguments, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They are essentially as follows:

- The appeal was deemed to have been filed.

- Should the Board deem the appeal not to have been filed, the matter should be referred to the Enlarged Board of Appeal for clarification as to whether the corrected appeal fee was to be seen as having been paid in time.

- D46 and D47 should be admitted into the proceedings while D48 and D49 should not. There was no objection against the admittance of D41 and D43 into the proceedings.

- Claim 1 of the main request was novel and inventive over D6. Claim 1 according to auxiliary requests I-VII was also inventive over D6.

XI. The respondents' arguments, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They are essentially as follows:

- The appeal was deemed not to have been filed.

- In the event that the Board deemed the appeal to have been filed two legal questions concerning legal certainty in the case of payments made more than one year after the due date, as well as concerning the lack of payment of a small amount, should be referred to the Enlarged Board of Appeal.

- D46 and D47 were late filed and should not be admitted into the proceedings. D48 and D49 should be admitted into the proceedings. D41 and D43 had already been admitted into the proceedings by the opposition division and were therefore part of the proceedings.

- Claim 1 of the main request lacked novelty over D6.

- Claim 1 of the main request lacked an inventive step starting from the compositions of examples 1 and 2 of D6 as the closest prior art. The same applied to claim 1 according to auxiliary requests I-VII.

Reasons for the Decision

1. Request for correction of the debit order - appeal deemed to have been filed

1.1 In the present case the appellant paid only the reduced appeal fee within the time limit under Article 108, first sentence, EPC. With letter of 17 December 2020 the appellant pointed out that the payment of the reduced appeal fee was due to an "unintentional oversight and human error, the original intention of the Appellant being to pay the correct fee, i.e. the full fee, already upon filing the Form 1038 with the Notice of Appeal". Furthermore, the appellant pointed out that it "checked by mistake the wrong appeal fee box in Form 1038 filed with the Notice of Appeal". Thus, the appellant requested that the amount of the appeal fee indicated in the debit order filed with the Notice of appeal be corrected under Rule 139 EPC. Furthermore, by debit order dated 17 December 2020 the appellant paid the full amount of the appeal fee, i.e. 2705 EUR.

1.2 In several decisions the Boards of Appeal acknowledged the applicability of Rule 139 EPC to debit orders (cf. T 317/19, T 2620/18, T 1000/19 and T 444/20). The Board

does not see any reasons to deviate from the established case law.

1.3 In G 1/12, Reasons 37, the Enlarged Board of Appeal summarised the following principles which the Boards of Appeal have developed as regards corrections under Rule 88, first sentence, EPC 1973 (Rule 139, first sentence, EPC):

(a) The correction must introduce what was originally intended. The possibility of correction cannot be used to enable a person to give effect to a change of mind or development of plans. It is the party's actual rather than ostensible intention which must be considered.

(b) Where the original intention is not immediately apparent, the requester bears the burden of proof, which must be a heavy one.

(c) The error to be remedied may be an incorrect statement or an omission.

(d) The request for correction must be filed without delay.

1.4 As to the above criteria a) and b) it is noted the following: The Notice of appeal contains a passage explicitly stating that the appeal fee in an amount of 1880 EUR be paid via Form 1038. Thus the amount indicated in the debit order is identical with the amount explicitly mentioned in the Notice of appeal which corresponded to the then valid amount for the reduced appeal fee. In that regard the appellant pointed out in essence that a template had been used for creating the Notice of appeal and that the error in

the amount of the appeal fee had not been detected due to the fact that the former amount for the (full) appeal fee was identical with the (then) valid amount of the reduced appeal fee. The Board finds this explanation credible. In that regard, the Board points to decision T 2620/18 (followed for instance also by T 444/20) which concerned very similar circumstances. Also in that case the appellant confused the then valid reduced appeal fee with the former sole appeal fee and indicated the incorrect amount of EUR 1880 both in the notice of appeal letter and in the payment form. According to the Board in that case, it was plausible that the appellant was guided by the previously applicable, known fee amount of EUR 1880 and mistakenly assumed that it was paying the full fee (see T 2620/18, Reasons point 5.4). The present Board does not see any reason to deviate from that decision. In view of the above the Board is satisfied that the correction sought introduces what was originally intended by the appellant and that this original intention is immediately apparent.

1.5 Since the request for correction relates to the debit order provided for in Form 1038, i.e. a document filed with the EPO, it is obvious that also above criterion c) is met in the present case.

1.6 As regards criterion d) respondents I and II argued (cf. respective letters dated 29 and 28 June 2021) that the request for correction was not filed without delay in view of the considerable time span between the issuing of the opposition division's decision (25 September 2019) or of the filing of the Notice of appeal (25 November 2019) and the filing of the request for correction (17 December 2020), i.e. arguing that

criterion d) as set out in G 1/12, point 37 of the Reasons, was not met in the present case.

1.7 In that regard the Board would like to point out that the relevant point in time for the question as to whether a request for correction has been filed without delay can only be the date on which the mistake had been discovered by the responsible person. Since the appellant filed the request immediately after having been informed by the EPO about the payment of the reduced appeal fee the Board considers criterion d) of G 1/12, point 37 of the Reasons, as met. The decisions cited by respondent 1 in that regard (cf. T 2620/18, Reasons points 5.7-5.9; T 444/20, Reasons point 2.4.5) do not deviate from the principle that the relevant point in time is the date on which the mistake had been discovered by the responsible person. The further cited decision T 3029/18 of 3 June 2020 (cf. Reasons point 1) is dealing with a request for re-establishment of rights and is thus not relevant for the present request for correction.

1.8 Furthermore, respondent I requested that a question of law be referred to the Enlarged Board of Appeal (cf. letter dated 29 June 2021, page 4, containing the exact wording of the request), relating to the question as to whether a period of more than one year would be acceptable for rectifying the payment of an appeal fee. In that regard both respondents argued in essence that any such rectification/correction would be detrimental to the principle of legal certainty and to the legitimate interests of the respondents and of the public.

1.9 In that regard the Board refers to above point 1.7 and its position that the relevant point in time for the

question whether the correction has been requested without delay is the date on which the mistake had been discovered by the responsible person. No deviating case law has been presented by the respondents in that respect. In the present case the EPO sent the Board's communication dated 22 December 2020 addressing the issue of payment of the reduced appeal fee to the appellant already in advance with e-mail of 17 December 2020. The appellant reacted on the same day by filing its request for correction of the debit order and by paying the correct amount of the appeal fee. Thus, the Board considers criterion d) of G 1/12, point 37 of the Reasons, as met.

1.10 As regards the principle of legal certainty and the legitimate interests of the respondents and the public addressed by respondents I and II the Board would like to emphasise that in the present case a Notice of appeal has been filed and a valid amount of the appeal fee has been paid in time. In such a procedural situation neither parties to the proceedings nor the public could have legitimate expectations that the appeal is deemed not to have been filed, since it is obvious that any such finding would require a decision of the Board of Appeal.

1.11 In view of the fact that the Enlarged Board of Appeal has already clarified the requirements for a correction under Rule 139 EPC in its decision G 1/12 and in the absence of any deviating line of case law the Board was in the position to decide on the request for correction without referring the question formulated by respondent I (see above point 1.8) to the Enlarged Board of Appeal. The request for referral was thus refused and the request for correction was allowed. In addition it is to be noted that the further question requested to

be referred to the Enlarged Board of Appeal concerning the lack of payment of a small amount (cf. page 5 of respondent's I letter dated 29 June 2021) was not decisive since the requested correction had been allowed.

1.12 In its reply to the appeal respondent II referred to J 3/01, point 10, and argued that a correction under Rule 139 EPC had only an *ab initio* effect and did not remedy a loss of rights which had already occurred. Respondent II concluded that the legal consequence of the failure to pay the correct amount of the appeal fee in time could thus not be remedied by a correction of the debit order. The Board does not share that view for the following reasons: The cited decision dates from 2002, i.e. before the issuing of G 1/12. In G 1/12, Reasons point 38, the Enlarged Board of Appeal emphasised the retroactive effect of a correction under Rule 139 EPC and came *inter alia* to the following conclusion:

> "Consequently, if correction of the error is allowed, the appeal will be found **admissible** and the condition of Article 107 EPC will have been satisfied **within the two-month period according to Article 108, first sentence, EPC.**" (emphasis by the Board)

The Board does not see any reason as to why this retroactive effect should not be applied to the payment of the appeal fee. Thus, the correction of the debit order means that the fee payment had been effected in time and that the appeal is deemed to have been filed (cf. also J 8/19, Reasons point 3; T 317/19, Reasons point 3).

2. Admittance

2.1 The appellant requested in their statement of grounds of appeal that D41 and D43 be found inadmissible (statement of grounds of appeal, pages 1 and 10-13). That request was withdrawn at the beginning of the oral proceedings in appeal. D41 and D43 were already admitted into the proceedings by the opposition division and the documents also form the basis of the contested decision. There is no legal provision for the Board to exclude these documents from the present proceedings.

2.2 Documents D46 and D47 were filed by the appellant with their statement setting out the grounds of appeal. The appellant submitted that D46 was filed in reaction to "the objection made during oral proceedings" against auxiliary request I and because arguments based on D45 had not been accepted at the oral proceedings before the opposition division (section 2 of the statement setting out the grounds of appeal). The appellant however did not specify which arguments were allegedly not accepted by the opposition division and how this would justify the admittance of D46 in appeal. D46 contains supplementary experimental evidence in support of an effect resulting from the use of micro talc as nucleating agent in claim 1 of auxiliary request I over the closest prior art D6. That however is not new to the appeal proceedings since that feature was already part of the claims as granted (claim 6). Furthermore, the same feature had also been considered to lack an inventive step over D6 at the outset of the opposition procedure (Notice of opposition of opponent 3, page 10, third paragraph; Notice of opposition of opponent 1, page 17, section VII.13). D46 therefore could and should have been filed earlier, during the opposition

proceedings. It follows that that document cannot be seen as a reaction to the contested decision. On this basis the Board finds it appropriate to exercise its discretion according to Article 12(6) RPBA 2020 by not admitting document D46 into the proceedings.

2.3 As to D47, it was said to contain information relevant to D6 and disprove the fact advanced by the opposition division in their decision that the PA6/66 used in the examples of D6 had a melting temperature of about 250°C, therefore higher than the one of PA6 (section 3.3.2 of the contested decision). Even if that fact had already been mentioned by the opposition division in the annex to their summons dated 5 February 2019, D47 merely established the undisputed fact that PA6/66 has a melting temperature of 192°C on the basis of information readily available to the public. On this basis the Board finds it appropriate to exercise its discretion according to Article 12(6) RPBA 2020 by admitting document D47 into the proceedings.

2.4 D48 and D49 were documents filed by respondent II with their letter of 28 June 2021. Respondent II did not provide any justification for the filing of these documents in appeal nor does the Board see a justification for the filing of these documents first in the appeal procedure. Under these circumstances the Board finds it appropriate to exercise its discretion according to Article 12(6) RPBA 2020 by not admitting document D48 and D49 into the proceedings.

Main request

3. Novelty over D6

3.1 The decision of the opposition division with regard to novelty made reference to two parts of D6, namely the description of a liner material found in paragraphs 15-41 and the compositions of examples 1 and 2 (sections 3.3.1 and 3.3.2 of the decision) that were used to produce hydrogen tank liner materials.

3.2 D6 pertains indeed to liner materials that can be used in hydrogen tanks (paragraphs 10-31, 51, Figure 1). The material of the hydrogen tank is not discussed in D6 apart from a brief mention of prior art tanks based on fiber-reinforced resin layers (paragraph 4). That passage however belongs to the introduction of D6 from which it is apparent that the reference to fiber-reinforced resin layers concerns hydrogen tanks of the prior art. In that regard, the reference to fiber-reinforced resin in that passage is not directly relevant to the liners of D6. Independently of that there is in D6 no mention of "continuous carbon or glass fibers" in composites used in tank materials as required by claim 1 of the main request. This cannot be seen as implied by the reference to fiber-reinforced resin layers which is a generic one and cannot be read as referring specifically to continuous carbon or glass fibers. The presence of "continuous carbon or glass fibers" in the structural fiber composite of the gas storage tank is thus a distinguishing feature of claim 1 of the main request over D6.

3.3 The Board concludes from the above that claim 1 of the main request is novel over D6.

4. Remittal

4.1 The appellant requested remittal of the case to the opposition division should novelty be acknowledged for the main request (statement setting out the grounds of appeal, page 2). It is, however, noted that the decision of the opposition division dealt with all grounds of opposition including novelty over document D6 for the main request and inventive step starting form document D6 for all auxiliary requests which were admitted into the proceedings. As the point which is to be decided remains the analysis of inventive step starting from document D6, the Board finds it appropriate to exercise its discretion according to Article 111(1) EPC by not remitting the present case to the opposition division for the discussion of inventive step and deciding on that issue.

5. Inventive step over D6

5.1 D6 was identified as the closest prior art by the opposition division. That choice is not contested by the parties in appeal nor does the Board see any reason to depart from D6 as the closest prior art.

5.2 Examples 1 and 2 of D6 were considered as a relevant starting point to assess inventive step in the decision of the opposition division. These examples (paragraphs 74 and 75 and Table 1) disclose the preparation of compositions comprising a polyamide resin (PA6) and an impact-resistant material (EBR) that correspond to i) the polyamide A and iii) the impact modifier according to claim 1 of the main request respectively. The individual amounts of all the components in these examples (Table 1) are such that the amount of EBR (examples 1 and 2: 17.5 wt.-%) is within the range

defined in claim 1 of the main request (at least 1 weight percent with respect to the total amount of the polymer composition). That was not in dispute in the appeal proceedings.

5.3 The compositions of examples 1 and 2 of D6 additionally contain a polyamide PA6/66 (Table 1). PA6/66 is nowhere disclosed as a nucleating agent for PA6. The opposition division nevertheless considered that PA6/66 was a nucleating agent on the grounds that PA6/66 had a melting temperature that was higher than that of PA6 and therefore met the definition of a nucleating agent disclosed in paragraph 15 of the patent in suit: "The term "nucleating agent" is known to a person skilled in the art and refers to a substance which when incorporated in a polymer forms nuclei for the growth of crystals in the polymer melt. Nucleating agents include for example polyamides having a higher melting temperature than the melting temperature of polyamide A".

5.4 D47 however shows that the commercially available PA6/66 used in examples 1 and 2 of D6 (5034B by Ube Industries) has a melting temperature (192°C) that is in fact lower than that of the PA6 used in the same examples of D6 (value of 220°C accepted by the parties). Thus, PA6/66 5034B by Ube Industries is not according to the definition found in paragraph 15 of the patent in suit. Since there is also no evidence on file showing that PA6/66 5034B could nonetheless be a nucleating agent on the grounds that it is a "substance which when incorporated in a polymer forms nuclei for the growth of crystals in the polymer melt", the Board does not find that the compositions of examples 1 and 2 of D6 were shown to contain a nucleating agent.

5.5 Paragraph 75 of D6 discloses that the compositions according to examples 1 and 2 were injection molded. The liner and gas storage tank are as such not described in the examples of D6 but it is derivable from paragraphs 11-13 and Figure 1 of that document that the compositions of the examples were prepared with the purpose of ultimately providing a hydrogen storage tank.

5.6 Claim 1 of the main request therefore differs from examples 1 and 2 of D6 in the presence of i) continuous carbon or glass fibers in the composite of the gas storage tank and ii) at least 0.001 wt.-% of nucleating agent in the polymer composition of the liner.

5.7 The patent in suit does not establish the presence of an effect resulting from the choice of a composite containing continuous carbon or glass fibers specifically in the tank material. That was also acknowledged by the appellant at the oral proceedings before the Board.

5.8 The appellant however considered that the presence of a nucleating agent in a liner composition as defined in claim 1 of the main request was surprisingly beneficial to the permeability of the gas storage tank having that liner composition as well as to preparation process of the liner composition itself. The appellant relied on the examples of the patent in suit and on the experimental report D41 for the permeability properties of the gas storage tank. As to the provision of an easier preparation process of the liner compositions, the appellant cited paragraph 5 of the patent in conjunction with the statement regarding the melt strength of the liner composition (paragraph 41). At the oral proceedings before the Board, the appellant

formulated the problem as the provision of a gas storage tank with a lower permeability that can be manufactured using existing production techniques.

5.8.1 According to the established case law, an unexpected effect (advantageous effect or feature) demonstrated in a comparative test can be taken as an indication of inventive step but the nature of the comparison with the closest state of the art must be such that the alleged advantage or effect is convincingly shown to have its origin in the distinguishing feature of the invention compared with the closest state of the art (Case Law of the Boards of Appeal, 10th Edition 2022, I.D.4.3.2). The question was thus whether the examples of the patent in suit relied upon by the appellant allowed a fair comparison that showed the presence of an effect.

5.8.2 Examples 1 and 2 of the patent in suit contain, as main material, a mixture of PA6 polyamide, micro talcum as nucleating agent and maleic anhydride (MAH) grafted ethene copolymer as impact modifier (IM) (Table 1). These components of examples 1 and 2 correspond to components i) to iii) in claim 1 of the main request. The comparative examples of the patent in suit however are not based on the same base material but instead contain high density polyethylene (HDPE) which is not according to the definition of components i) or ii) in claim 1 of the main request. The comparative examples of the patent in suit differ therefore in all three components of the liner composition with respect to examples 1 and 2. In view of that, the examples and comparative examples of the patent in suit cannot show that an effect is causally linked to the presence of a nucleating agent in the liner composition.

5.8.3 D41 is an experimental report that shows two compositions of polyamide PA6, an impact modifier and a spreading agent. The two compositions only differ from one another in the presence of 0.08 wt.-% of micro talc (composition 2). D41 describes very little as to what was produced and how from these compositions but the disclosure of test samples of specific thickness and area imply that films of these compositions were produced and that the permeabilities to hydrogen (H_2) and nitrogen (N_2) were measured under comparable conditions. Table 2 of D41 reports the values of permeabilities of these test samples as well as those of a film obtained from an unidentified HDPE. It is apparent from the data in table 2 that the permeability of these films is foremost affected by the nature of the resin of the base material, as shown by the permeability of films based on HDPE which is several times higher than that of films based on PA6. A comparison of composition 1 (without micro talcum) and composition 2 (with micro talcum) shows that the presence of micro talc in the PA6 composition has an effect on the permeability of films made therefrom which is significantly smaller than that reported for the resin. It is also apparent from table 2 that the presence of micro talcum has opposite effects on the permeability of the film towards hydrogen and nitrogen which could not be explained by the appellant. The Board therefore finds that the data reported in D41 are inconclusive and that they do not provide a valid support for the acknowledgement of an improvement in permeability caused by the presence of a nucleating agent in the liner composition.

5.8.4 The appellant also contended for the first time at the oral proceedings before the Board that the use of a nucleating agent according to claim 1 of the main

request would lead to liner compositions having advantageous melt strength. The appellant referred to paragraph 41 of the patent in suit disclosing that the melt strength of liners according to claim 1 of the main request was comparable to the one of compositions not containing a nucleating agent. The appellant derived therefrom that the presence of a nucleating agent in the liner composition lead to a liner that did not necessitate a change of the preparation process of the gas storage tank.

5.8.5 Paragraph 5 of the patent in suit cited by the appellant refers to an "easier process" for the production of gas storage tanks. There is however no evidence on file showing that the skilled person would expect a more complex preparation process of gas storage tanks for liner compositions containing a nucleating agent in view of a different melt strength. Based on paragraph 41 of the patent in suit, the Board can only conclude that the use of a nucleating agent in the liner compositions of the examples has in fact no effect on the melt strength of these compositions. That however cannot be seen as an advantage over liner compositions that do not contain a nucleating agent and cannot lead to the acknowledgement of an advantage to be taken into account in the formulation of the technical problem.

5.9 In view of the lack of evidence supporting the presence of an effect, the Board finds that the technical problem over D6 is to be formulated as the provision of further gas storage tanks.

5.10 D6 teaches that current hydrogen tanks are made of fiber reinforced resins (paragraph 4). Considering that continuous carbon or glass fibers are known reinforcing

agents in the composite industry (which was not disputed), their use in the context of the hydrogen tank of D6 does not as such justify the presence of an inventive step. In fact, the appellant acknowledged at the oral proceedings before the Board that they did not rely on the presence of continuous carbon or glass fibers in the assessment of inventive step of claim 1 of the main request.

5.11 D6 teaches also the optional use of nucleating agents in the liner material (paragraph 42). In view of that, the use of these agents in the compositions of examples 1 and 2 of D6 would have been obvious when looking for further gas storage tanks since it is already suggested in the closest prior art document. While the amount of nucleating agent is not disclosed in D6, amounts of these agents that overlap with the range defined in claim 1 of the main request were known from D25 (amount of 0.2 and 1 wt.-% of PA66 as nucleating agent in PA6 in Table II). While D25 does not concern the production of liners for gas tanks as such, it does concern the use of nucleating agents in PA6 polymers which are similar to those of D6 and the patent in suit. In view of that, the teaching of D25 relating to these polymers is relevant to the present question of inventive step. Moreover, a range defined only by a lower limit of 0.001 weight percent covers in principle all possible values a skilled person could take into consideration. Claim 1 of the main request therefore does not involve an inventive starting from examples 1 and 2 of D6 as the closest prior art.

Auxiliary requests I-VII

6. Inventive step

6.1 Claim 1 of auxiliary request I differs from claim 1 of the main request in that the nucleating agent is micro talcum. Examples 1 and 2 of D6 were further seen as the closest prior art and the question of inventive step was whether the selection of micro talcum was linked to an effect. As shown in the discussion of the main request however, the data contained in D41 are inconclusive as to the presence of an effect and the examples of the patent in suit do not support the presence of an effect over D6. In view of that, the problem over D6 remains the provision of further gas storage tanks. It was not disputed that micro talcum was a known nucleating agent of polyamide resins. That is confirmed in paragraph 1 of D29 and its use is also disclosed in the specific compositions of paragraphs 23 and 39. The teaching of D29 is general and as such it applies to the compositions of D6. In view of this and of the reasons outlined for claim 1 of the main request claim 1 of auxiliary request I lacks an inventive step over examples 1 and 2 of D6 as the closest prior art.

6.2 Claim 1 of auxiliary request II differs from claim 1 of the main request in that the amount of nucleating agent is at most 0.15 wt.-%. The range of nucleating agent now defined in claim 1 of auxiliary request II is therefore 0.001-0.15 wt.-%. Neither the patent in suit nor D41 show an effect that can be attributed to the choice of an amount of the nucleating agent in that range. The problem remains therefore the provision of further gas storage tanks. Possible amounts of nucleating agents that are according to claim 1 of auxiliary request II are already disclosed in the prior

art such as in D29 (0.075 wt.-% in paragraph 23 and 0.1 wt.-% in paragraph 39). In view of that, the use of such an amount in the closest prior art D6 is obvious and the conclusion of lack of inventive step reached for claim 1 of the main request equally applies to claim 1 of auxiliary request II.

6.3 Claim 1 of auxiliary request III differs from claim 1 of auxiliary request II in that the nucleating agent is micro talcum, carbon black, silica, "titane" dioxide or nano-clay. In claim 1 of auxiliary request IV, the nucleating agent is further limited to micro talcum. The question of inventive step of claims 1 of these auxiliary requests was whether the use of 0.001-0.15 wt.-% of micro talcum as nucleating agent in liner compositions was inventive over examples 1 and 2 of D6 which remained the closest prior art. Neither the patent in suit nor D41 show an effect that can be attributed to the choice of an amount of the specific nucleating agents in that range. In that regard, for the same reasons as detailed for the main request, neither the patent in suit nor D41 were found to provide evidence of an effect linked to the use of 0.001-0.15 wt.-% of micro talcum as nucleating agent. Since the range of nucleating agent disclosed in D29 concerns micro talcum, claims 1 of auxiliary requests III and IV lack an inventive step for the same reasons as outlined for the previous requests.

6.4 Claim 1 of auxiliary request V differs from claim 1 of auxiliary request III in that in claim 1 the polyamide A is PA6, PA66 or blends thereof. In claim 1 of auxiliary request VI the impact modifier is further limited to ethylene/propylene copolymer functionalized with anhydride groups. The appellant acknowledged at the oral proceedings before the Board that the

limitations performed with regard to the polyamide A in auxiliary requests V and VI and with regard to the impact modifier in auxiliary request VI were not associated with any new effect. In fact, examples 1 and 2 chosen as starting point in the closest prior art D6 already disclosed the use of PA6 as polyamide. The limitation of claim 1 of auxiliary request V therefore does not constitute a further distinguishing feature over D6. Claim 1 of auxiliary request V lacks therefore an inventive step for the same reasons as outlined for claim 1 of auxiliary request III. The limitation of the impact modifier in auxiliary request VI was also not linked to any effect, the problem therefore remained, as for auxiliary request III, the provision of further gas storage tanks. The possible use of ethylene/ propylene copolymer functionalized with anhydride groups as impact modifier in polyamides is already suggested in D2a (paragraphs 40-53), D4 (column 5, lines 31-39) and in generic form in paragraph 38 of D6. The use of such an impact modifier in the liner compositions of D6 in order to provide further storage tanks therefore does not involve an inventive step. The same reasoning and conclusion apply to claim 1 of auxiliary request VII which differ from auxiliary request VI only in that the nucleating agent is limited to micro talcum. As discussed for auxiliary requests I and IV, the use of micro talcum in the compositions of D6 does not involve an inventive step. The combination of micro talcum as nucleating agent with PA6 as polyamide A and ethylene/propylene copolymer functionalized with anhydride groups as impact modifier was not associated with any effect. The problem over the closest prior art D6 therefore remained the provision of further gas storage tanks. The aggregation of features relating to the choice of polyamide A, impact modifier and nucleating agent in claim 1 of

auxiliary request VII lacks an inventive step for the same reasons as outlined for claim 1 of auxiliary requests IV and VI.

7. As none of the requests on file fulfils the requirements of Article 56 EPC, the appeal is to be dismissed.

Order

For these reasons it is decided that:

1. The request of respondent I (opponent 1) for referral to the Enlarged Board of Appeal is refused.

2. The appeal is dismissed.

The Registrar: The Chairman:

D. Hampe D. Semino

Decision electronically authenticated