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Datasheet for the decision of 17 July 2018

Case Number: T 1806/15 - 3.3.03

Application Number: 09710365.9

Publication Number: 2245089

IPC: C08K5/00, C08L27/06

Language of the proceedings: EN

Title of invention:
A REPLACEMENT PLASTICIZER SYSTEM FOR PHTHALATE-PLASTICIZED FORMULATIONS

Patent Proprietor:
Union Carbide Chemicals & Plastics Technology LLC

Opponent:
Evonik Degussa GmbH

Relevant legal provisions:
EPC Art. 123(2), 83, 54, 56
RPBA Art. 12(4)

Keyword:

Late-filed facts - submitted with the statement of grounds of appeal - no reason to be held inadmissible
Amendments - added subject-matter (no)
Sufficiency of disclosure - (yes)
Novelty - (yes)
Inventive step - (yes)

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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 1806/15 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 17 July 2018

Appellant: (Opponent)	Evonik Degussa GmbH Rellinghauserstrasse 1-11 45128 Essen (DE)
Representative:	Wins, Torben Evonik Degussa GmbH IPM-PAT-Marl Paul-Baumann-Straße 1 45772 Marl (DE)
Respondent: (Patent Proprietor)	Union Carbide Chemicals & Plastics Technology LLC 2020 Dow Center Midland, MI 48674 (US)
Representative:	Boult Wade Tennant LLP Verulam Gardens 70 Gray's Inn Road London WC1X 8BT (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 15 July 2015 concerning maintenance of the European Patent No. 2245089 in amended form.**

Composition of the Board:

Chairman O. Dury
Members: D. Marquis
R. Cramer

Summary of Facts and Submissions

I. The appeal lies with the decision of the opposition division posted on 15 July 2015 maintaining European patent EP 2 245 089 in amended form.

II. The claims of the application as filed which are relevant to the present decision read as follows:

"1. A plasticizer system composition comprising:
(a) a primary plasticizer consisting of an epoxidized fatty acid ester plasticizer and
(b) a secondary plasticizer."

"2. The plasticizer system composition of Claim 1 wherein the primary plasticizer is selected from the group consisting of epoxidized biodiesel and epoxidized derivatives of fatty acid esters of biodiesel."

"4. The plasticizer system of Claim 2 wherein the epoxidized fatty acid ester is an epoxide of a fatty acid methyl ester."

"5. The plasticizer system of any of Claims 1 to 4 wherein the secondary plasticizer is selected from the group consisting of epoxidized soy oil, epoxidized linseed oil, epoxides of other vegetables, chlorinated hydrocarbons, trimelitates, and phosphate-based plasticizers."

"6. The plasticizer system of Claim 5 wherein the system is phthalate free."

III. European patent EP 2 245 089 was opposed on the grounds that its subject matter extended beyond the content of the application as originally filed, that it was not

sufficiently disclosed and that it lacked novelty and inventive step.

IV. During opposition proceedings, the following documents *inter alia* were cited:

D1: Email thread from 7 January 2013 between Mr Schmitt and Miss Hebert

D1a: Catalogue of the German National Library concerning the 7th "Freiberger Polymertag", 21-22 April 2005, FILK Freiberg

D1b: Email statement of the German National Library regarding D2

D2: Conference transcript, "7. Freiberger Polymertag", 21-22 April 2005

D3: Letter from 10 December 2012 from Miss Hebert to Mr Schmitt

D3a: Statement from Dr. B. Morgenstern regarding the public availability of D4

D3b: Programme of the 4th International Symposium, "Werkstoffe aus Nachwachsenden Rohstoffen" with abstract of a presentation by Mr Morgenstern

D4: Presentation "Anwendung modifizierter Fettsäureester als Weichmacher für PVC", Bernd Morgenstern, Erfurt, 12 September 2003

D8: US 3,868,341

D9: US 5,756,570

D12: Handbook of Polyvinyl Chloride Formulating, edited by EJ. Wickson, Wiley, 1993, page 254

D13: Online entry on Plasticizers, Ullmann's Encyclopedia of Industrial Chemistry, David Cadogan, Christopher Howick

V. The decision of the opposition division to maintain the patent in amended form was announced at the oral proceedings on 23 June 2015. The decision was based on the main request (claims 1 to 5) filed with letter of 30 September 2013 as well as a description adapted accordingly.

Claims 1-5 of the main request read (additions as compared to claims 1, 3, 8, 10 and 11 of the application as originally filed are indicated in bold, deletions in strikethrough):

"1. A plasticizer system composition comprising:
(a) a primary plasticizer consisting of an epoxidized fatty acid ester plasticizer **selected from the group consisting of epoxidized biodiesel, epoxidized derivatives of fatty acid esters of biodiesel and an epoxide of a fatty acid methyl ester**, and
(b) a secondary plasticizer, **which is epoxidized soy oil, wherein the system is phthalate free**."

"2. The plasticizer system composition of Claim ~~2~~ **1** wherein the biodiesel is derived from a vegetable oil."

"3. A plasticized polymer composition comprising:
(a) a polymer selected from the group consisting of halogenated polymers, acid-functionalized polymers,

anhydride-functionalized polymers, and nitrile rubbers; and
(b) a plasticizer system according to ~~any of~~ Claim~~s~~ 1 ~~to 6~~ **or 2**."

"4. The plasticized polymer composition of Claim ~~8 or 9~~ **3** wherein the polymer is a polyvinyl chloride polymer (PVC) selected from the group consisting of PVC homopolymers, PVC copolymers, polyvinyl dichlorides (PVDC), and polymers of vinylchloride with vinyl, acrylic and other co-monomers."

"5. A cable comprising one or more electrical conductors or a core of one or more electrical conductors, each conductor or core being surrounded by a layer comprising the plasticized polymer composition according to ~~any of~~ Claim~~s~~ ~~8 to 10~~ **3 or 4**."

VI. The decision of the opposition division, as far as relevant to the present decision, can be summarised as follows:

(a) Claim 1 of the main request did not extend beyond the content of the application as originally filed because the specific combination of epoxide of a fatty acid methyl ester as a primary plasticizer with epoxidized soy oil was disclosed on page 3, lines 6-8 of the description as originally filed.

(b) The ground of opposition under Article 100(b) EPC was not prejudicial to the maintenance of the patent since the term "long chain", objected to by the opponent, was well known to any person skilled in the art.

(c) D1a, D1b, D3a, D3b, D12 and D13 were admitted into the procedure.

(d) D1a/D1b and D3a/D3b established that D2, respectively D4, were made publicly available before the priority date of the patent in suit.

(e) Claim 1 was novel since neither D2 (pages O1-O4) nor D4 (slides 3, 4, 9, 10, 12, 17 and 25) disclosed the combination of a primary plasticizer with epoxidized soy oil as a secondary plasticizer (emphasis from the contested decision) as defined in claim 1 of the main request.

(f) The claimed subject matter differed from the closest prior art D4 in that epoxidized soy oil was present as the secondary plasticizer.

(g) According to the Division, example 3 of the opposed patent showed that the presence of a primary plasticizer (epoxidized biodiesel) and a secondary plasticizer (epoxidized soy oil) lead to PVC with good hardness and a percentage of elongation retained of 73%, which was higher than the minimum of 65% required.

(h) Neither D4 nor D12 disclosed epoxidized soy oil as a secondary plasticizer in combination with the primary plasticizers of claim 1, nor that PVC compositions with a good hardness and a good percentage of elongation retained could be obtained. An inventive step was acknowledged for the main request because a good hardness and a good percentage of elongation retained was surprising.

VII. The opponent (appellant) lodged an appeal against that decision and filed the following documents:

D14: CEH Marketing Research Report Plasticizers by Sebastian N. Bizzari with Milen Blagoev and Akihiro Kishi, 2009, Chemical Economics Handbook - SRI Consulting, pages 1, 16, 35, 36, 60, 119, 120, 145

D15: Experimental report E2

VIII. In its reply to the statement of grounds of appeal, the patent proprietor (respondent) filed three auxiliary requests as well as the document:

D16: Experimental report E1 filed by the respondent in the opposition procedure on 30 September 2013

IX. Summons to attend oral proceedings on 17 July 2018 were dispatched by letter of 11 December 2017.

X. With letter of 13 February 2018, the appellant announced that it would not be represented at the oral proceedings and that the request for oral proceedings was withdrawn. Furthermore, the following document was filed:

D17: Catalogue of the 4th International Symposium, "Werkstoffe aus Nachwachsenden Rohstoffen", 11-12 September 2003, Erfurt with CD and documentation (Title page, program and abstracts of the presentations pages 2-14)

XI. The respondent filed a reply on 22 May 2018.

XII. In a communication sent in preparation of oral proceedings and dated 28 May 2018, the Board summarised

the points to be dealt with and provided a preliminary view on the disputed issues. A copy of D17, including CD, was sent to the respondent.

XIII. During the oral proceedings, which were held on 17 July 2018 in the absence of the appellant, as announced, the respondent withdrew its request made in writing to either "not consider" or "not admit" into the procedure the sufficiency objection put forward by the appellant in appeal.

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

Main request

Amendments

(a) Claim 1 of the main request request was amended in that it had been limited to a combination of features, a phthalate free system, the use of epoxidized soy oil as secondary plasticizer and the three alternative primary plasticizers, that was not disclosed as such in the application as originally filed. In particular, the three components presented as alternative primary plasticizers in claim 1 of the main request were not disclosed as such in claims 4 and 2 of the application as originally filed. Claim 1 therefore infringed Article 123(2) EPC.

Sufficiency of disclosure

(b) Claim 1 of the main request defined that the primary plasticizer could be selected from the

group consisting of epoxidized biodiesel and epoxidized derivatives of fatty acid esters of biodiesel. The concept of biodiesel was defined in the specification as mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats. Since it could not be inferred therefrom what "long chain" would mean, the claimed subject matter was not sufficiently disclosed.

Admittance of D14 and D15

(c) D14 was submitted as a reaction to the argument against D12. D14 was relevant in that it showed that epoxidized soy oil was known as a plasticizer in the art before the priority date of the patent in suit. D14 should therefore be admitted into the proceedings.

(d) D15 was filed as a reaction to the reasoning of the opposition division acknowledging the presence of an effect based on examples 3 and 4 of the patent in suit. D15 should therefore be admitted into the proceedings.

Public availability of D2 and D4

(e) D2 was available to the public before the priority date of the patent in suit, as shown by D1 and D1b.

(f) D3a and D3b showed that the presentation D4 was available to the public in 2003. Furthermore, D17 contained a CD with the presentation D4 as it was distributed at the conference and made available to the public thereafter through ordering at the FILK institute.

Novelty

(g) D2 dealt with the use of epoxidized fatty acid esters in phthalate free plasticizer systems for PVC compositions. D2 disclosed epoxidized methyl and isopropyl esters of long chain fatty acids corresponding to the primary plasticizers as claimed. That document further disclosed that the mixture of these primary plasticizers with other substances could be used to adjust the viscosity of PVC pastes. In that context, D2 disclosed epoxidized vegetable oils and epoxidized fatty acid-2-ethylhexyl esters as secondary plasticizers. D12 and D14 showed that the skilled person would have reduced the concept of epoxidized vegetable oils to epoxidized soy oil. The subject matter of claims 1 to 4 of the main request lacked therefore novelty in view of D2.

(h) D4 concerned the use of modified fatty acid esters as plasticizers in phthalate free systems for PVC. Slide 4 of D4 disclosed that the properties of these compositions could be tailored by mixtures of modified fatty acid esters and epoxidized vegetable oils. Slides 9, 10 and 25 disclosed that modified fatty acid of short chain esters were used as primary plasticizers. Slide 17 taught that admixing a less gelifying substance to these esters would be advantageous in order to avoid a too strong gelification. These substances were identified as epoxidized vegetable oils and epoxidized fatty acid-2-ethylhexyl esters in slides 11 and 17 of D4. The skilled person knew from D13 that the efficiency of primary plasticizers could be adjusted by secondary plasticizers. He would also have reduced the concept of epoxidized vegetable

oils to epoxidized soy oil. The subject matter of claims 1 to 4 of the main request therefore lacked novelty over D4.

Inventive step

(i) D4 or D2 could be chosen as the document representing the closest prior art. Since D4 disclosed the combination of primary and secondary plasticizers, the claimed subject matter only differed from D4 in that epoxidized soy oil was selected as an epoxidized vegetable oil.

(j) Examples 3 and 4 of the patent in suit did not establish the presence of any effect linked to the use of epoxidized soy oil over the closest prior art since these examples only differed from one another in that a secondary plasticizer had been used. The technical problem that could be derived from the documents on file was the provision of alternative compositions of plasticizers.

(k) D15 was a rework of examples 3 and 4 of the patent in suit alongside an example based on epoxidized linseed oil as a secondary plasticizer. It showed that a plasticizer system containing epoxidized linseed oil performed even better than a system based on epoxidized soy oil. D15 therefore established that the technical problem did not involve an improvement over D4.

(l) The solution claimed in the main request was not inventive since D12 and D14 already taught that epoxidized soy oil was known as the most common epoxidized vegetable oil in the art. Furthermore, slide 5 of D4 already suggested the need for good

heat resistance of the mechanical properties including the retention elongation after storage under elevated temperatures. D14 disclosed the addition of epoxidized vegetable oils to establish heat resistance in PVC compositions. D8 and D9 additionally disclosed the use of epoxidized soy oils as agents of heat resistance. The subject matter of claims 1 to 5 of the main request therefore lacked an inventive step over D4.

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

Main request

Amendments

(a) Claim 1 of the main request found a basis in claim 1 of the application as filed. In that claim, the primary plasticizer was further specified to be one of the primary plasticizers of original claims 2 and 4. The secondary plasticizer was specified to be one of the secondary plasticizers specified in original claim 5. The requirement that the system was phthalate free was to be found in original claim 6. Thus claim 1 of the main request found basis in a combination of original claims 1, 2, 4, 5 and 6, it only being further necessary to identify the epoxidized soy oil as the secondary plasticizer from original claim 5. In addition, page 2, lines 13 to 19 of the application as originally filed listed "epoxidized biodiesel and epoxidized derivatives of fatty acid esters of biodiesel" separately from "epoxide of a fatty acid methyl ester". The claims of the main request did

not infringe Article 123(2) EPC.

Sufficiency of disclosure

(b) The objection of the appellant relating to the sufficiency of disclosure appeared to be a mere repetition of section 2 of the original notice of opposition. There was nothing in the grounds of appeal which indicated why the opposition division incorrectly decided on that ground. The reasons given by the opposition division were therefore adhered to. Also, the question of what was meant by "long chain" in the patent in suit was more a matter of clarity under Article 84 EPC rather than sufficiency under Article 83 EPC. Since the term "biodiesel" was in the claims as granted, it was clear that no valid argument under Article 84 EPC could be introduced into the opposition proceedings.

Admittance of D14 and D15

(c) There was no reason why D14 could not have been introduced into the proceedings in front of the opposition division. D14 was of no relevance and had not been filed in direct reaction to the Opposition Division's decision. D14 should not be admitted into the proceedings.

(d) The Test Report D15 had been filed late, for the first time with the grounds of appeal and no reason had been provided why it could not have been filed in front of the opposition division. The data contained in D15 appeared to contradict the respondent’s data as laid out in the specification of the patent in suit. Furthermore, the comparison

with a composition containing epoxidized linseed oil was not relevant having regard to the closest prior art. Consequently D15 should not be admitted into the proceedings.

Public availability of D2 and D4

(e) D2 appeared to be the conference proceedings of a conference held on 21 and 22 April 2005. No proof was provided that could show that the document had been made available at the conference. There was also no publication date given in the relevant pages of D2, namely pages O1 to O8. D1 did not provide the necessary proof of the public availability of D2 before the priority date of the patent in suit because the email filed as D1 provided insufficient details to determine with certainty that D2 had been made available. Dlb apparently confirmed that the conference proceedings of D2 were made available to the German National Library for use since August 2005, but it did not provide a more precise date. This showed that there was uncertainty in the Library's records. Under these circumstances, it had not been proven beyond reasonable doubt that D2 had been made available to the public prior to the priority date of the patent in suit so that D2 was not citable in the present proceedings.

(f) There was no indication in D4 itself that these slides had been published or otherwise been made available to the public. Besides, there was no absolute proof that the slides referred to in D3a were the exact slides filed as D4. D3b only referred to a talk given by Dr. Morgenstern but, apart from a brief abstract, no further details

were given. It had therefore not been shown that D4 was available before the priority date of the patent in suit.

Novelty in view of D2 or D4

(g) D2 did not explicitly disclose epoxidized soy oil. The generic reference to epoxidized vegetable oil contained in D2 could not be seen as an indication that epoxidized soy oil could have been used. D12 and D14 both only indicated that soy oil was "predominant", clearly allowing for other oils to be used, but they did not disclose that the only possible vegetable oil was soy oil. The claimed subject matter was novel over D2.

(h) The many different passages in D4 could not be mosaiced together in order to arrive at a disclosure falling within the claims of the main request. D4 was very sketchy and did not explicitly disclose a combination of a primary plasticizer with a secondary plasticizer, let alone an epoxidized soy oil. The claimed subject matter was novel over D4.

Inventive step

(i) Assuming that D4 belonged to the state of the art, it could be seen as the document representing the closest prior art. D4 taught that epoxidized oil and epoFS-2-EHE were secondary plasticizers, but did not clearly teach if and how they had indeed been used in combination with epoxidized fatty acid methyl esters as primary plasticizers as claimed, nor that PVC compositions with a good hardness and good percent elongation retained after ageing could

be obtained.

(j) The technical problem was to provide a plasticizer composition having improved performance. This was illustrated, for instance, in the examples of the patent in suit in which it was shown that by replacing some epoxidized biodiesel as primary plasticizer with epoxidized soy oil as secondary plasticizer, a greater elongation at break was retained after ageing.

(k) There was nothing in D4 which would have led one skilled in the art to consider using epoxidized soy oil as a secondary plasticizer in order to achieve this result. D4 was entirely silent with regards to this feature. D4, in the summary slide 25, only referred to secondary plasticizers as having the ability to adjust the paste viscosity. It was therefore only of interest in the manufacturing of the article rather than its long-term ageing.

(l) D14 taught that epoxy plasticizers provided two principle functions - plasticisation and heat stabilisation but this was not, as suggested by the appellant, a teaching that epoxy plasticizers improved the stretching capacity after storage at an elevated temperature. There was also nothing in D14 which referred to the use of epoxidized soy oil as a secondary plasticizer to modify the properties of the primary plasticizer. Consequently, one skilled in the art starting from D4 seeking a plasticizer composition with improved performance with respect to elongation retained after ageing would not be provided with the solution of claim 1 of the main request.

(m) Examples 1 and 2 of D15 which were said to replicate example 3 and comparative example 4 of the patent in suit contradicted the results obtained by the proprietor. D15 could therefore not be trusted. The fact that D15 concluded that epoxidized linseed oil could be seen as another secondary plasticizer was not relevant.

(n) Besides, evidence of improved performance was found in D16. The experimental report of D16 also concerned the resistance to ageing as shown by the colouration of the PVC compositions. That effect could be derived from the patent in suit. The claimed subject matter was inventive over D4.

XVI. The opponent (appellant) requested that the decision under appeal be set aside and that the patent be revoked.

XVII. The respondent requested that the appeal be dismissed, or, alternatively, that the decision under appeal be set aside and the patent be maintained on the basis of one of the first to third auxiliary requests submitted with the reply to the statement of grounds of appeal. The respondent also requested that documents D14 and D15 not be admitted to the proceedings.

Reasons for the Decision

Main request

1. Amendments

1.1 The appellant contended that there was no basis in the application as originally filed for claiming an epoxide

of a fatty acid methyl ester as an alternative primary plasticizer alongside epoxidized biodiesel and epoxidized derivatives of fatty acid esters of biodiesel in claim 1 of the main request.

1.2 The part of claim 1 of the main request corresponding to the subject matter of claim 6 dependent on claims 5, 2 and 1 in the application as originally filed, which discloses a phthalate free plasticizer system comprising a primary plasticizer consisting of an epoxidized fatty acid ester plasticizer selected from the group consisting of epoxidized biodiesel, epoxidized derivatives of fatty acid esters of biodiesel and an epoxidized soy oil as a secondary plasticizer, was not objected to.

1.3 The question that was posed with regards to the requirements of Article 123(2) EPC was whether the application as originally filed provided a basis for claim 1 of the main request when the primary plasticizer is an epoxide of a fatty acid methyl ester.

1.4 The passage of the description as originally filed on page 3, lines 6-8 reading "For example, when the epoxidized fatty acid ester is an epoxide of a fatty acid methyl ester, a suitable secondary plasticizer is preferably epoxidized soy oil" and cited as a basis in the contested decision explicitly discloses the exact pair of primary and secondary plasticizers now defining contested claim 1 of the main request. It provides a direct and unambiguous basis for the combination of plasticizers as claimed.

1.5 The passage in lines 13-14 on the same page additionally indicates that phthalate free systems are preferred. This sentence is not limited to any specific

combination of primary and secondary plasticizers and as such the reader understands that it applies in its generality to any combination of primary and secondary plasticizer disclosed in the leading paragraphs starting on page 2, line 13 and ending on page 3, line 12 of the application as originally filed.

1.6 The Board therefore concludes that claim 1 of the main request request finds a basis partly in the subject matter of claim 6 dependent on claims 5, 2 and 1 and partly on the passage of page 3, lines 6-14 of the application as originally filed. Under these circumstances, the question of whether a correction of the claim dependency of claim 4 of the application as originally filed was necessary to provide a basis for claim 1 of the main request provided is not relevant. The requirements of Article 123(2) EPC are thus met.

2. Sufficiency of disclosure

2.1 Lack of sufficiency of disclosure of the claimed subject matter was addressed in the decision of the opposition division (see point VI(b) above). The appellant merely contended in appeal that the term "long chain" fatty acid was not defined in the patent in suit, a point which was however already addressed in the contested decision (paragraph on top of page 4). In that respect, the appellant did not contest nor engaged with the reasoning of the opposition division but merely repeated arguments as provided in the notice of opposition. The appellant chose not to act on that matter even after the Board had drawn the appellant's attention to that point in the communication pursuant to Article 15(1) RPBA (see section 11.2).

2.2 The Board sees therefore no reason to deviate from the conclusion of the opposition division on that ground of opposition. The subject matter of the main request is thus sufficiently disclosed.

2.3 Admittance of D14 and D15

2.3.1 D14 and D15 were filed by the appellant with the statement setting out the grounds of appeal, i.e. pursuant to the requirements of Article 12(1) and (2) RPBA. Their admissibility into the proceedings, which was contested by the respondent, therefore undergoes the stipulations of Article 12(4) RPBA.

2.3.2 D14 was cited in reply to an argument submitted by the respondent during the first instance proceedings relating to the publication date of D12 that was also seen as being relevant to the assessment of novelty in view of D2 and D4 (page 5 of the statement setting out the grounds of appeal). D14 is meant to provide evidence of the extensive use of epoxidized soy oil in industry over epoxidized linseed oil, at the priority date of the patent in suit. As far as D14 is used to establish the common general knowledge relevant to the assessment of documents used in the proceedings, the Board sees no reason to hold D14 inadmissible pursuant to Article 12(4) RPBA.

2.3.3 D15 is an experimental report which pertains to the inventive step assessment of the claims, in particular the definition of the technical problem solved over the closest prior art. D15 was filed in reaction to the contested decision and notably in order to challenge the decision of the opposition division in view of the technical effect resulting from the distinguishing feature over D4. D15 was thus filed at the earliest

possible stage of the appeal proceedings. Therefore, it is not justified to hold D15 inadmissible pursuant to Article 12(4) RPBA.

2.3.4 The Board concludes that there is no reason to hold documents D14 and D15 inadmissible pursuant to Article 12(4) RPBA.

3. Public availability of D2 and D4

3.1 D2 is a conference transcript titled "7. Freiberger Polymertag", 21-22 April 2005, FILK Freiberg, the pages O1 to O8 of which correspond to an article of Mr. Morgenstern titled "Epoxidierte Fettsäureester als Weichmacher für PVC" which is cited against the patent in suit. The question of the date of the public availability of D2 and the above mentioned article by Mr. Morgenstern is dealt with in document D1b provided by the appellant.

3.1.1 D1b is an email signed by an employee of the German National Library (Mrs. Hoffmann) indicating that the pages O1 to O8 of the publication "7. Freiberger Polymertag" referred to as D2 and corresponding to an article from Mr. Morgenstern had been available in the the library in August 2005 at the latest.

3.1.2 With regard to the identification of D2, D1b identifies the title of D2 as well as its date and the page numbers corresponding to the article of Mr. Morgenstern. D1a, which is the entry in the catalogue of the German National Library corresponding to D2 also lists the title of D2, its date and further contains the total number of pages of D2 which all match the document filed in the current proceedings. The Board is thus satisfied that the document referred

to in D1b and D1a is the document D2 filed by the appellant (then opponent) with the notice of opposition and cited in the current appeal proceedings.

3.1.3 With regard to the date of the public availability of D2, it can be deduced from D1b that even if D2 had been made available at the German National Library on the last day of August 2005, it would still have been available two and a half years before the priority date of the patent in suit (15 February 2008). Thus, even if the exact day of first availability is not provided, the Board is satisfied that D2 was available before the priority date of the patent in suit.

3.2 Concerning the presentation D4, the arguments of the parties revolved around the public availability of the presentation D4 by distribution of a catalogue and CD (as contained in D17) at the symposium or by order at the FILK Institute after the symposium, as put forward by the opponent in the statement of grounds of appeal (point 3.1, page 6).

3.2.1 Regarding the public availability of the catalogue and CD of the symposium filed as D17 into the proceedings, the respondent questioned in the written proceedings before the Board whether the data contained on the CD was identical to document D4 cited in the present proceedings. After a copy of both the catalogue and CD were provided to the respondent with the communication of the Board pursuant to Article 15(1) RPBA, that point was not in dispute at the oral proceedings. The fact that the catalogue of the symposium containing the CD (D17) was available shortly after the symposium in Erfurt on 12 September 2003, as claimed in D3a, was also not in dispute. The Board concludes that the evidence on file shows that D4 was made publicly

available at least by way of its distribution on a CD.

4. Novelty

4.1 D2 pages O1-O8, contribution of Mr. Morgenstern

4.1.1 The object of pages O1-O3 of D2 is a discussion of some thermodynamical parameters (δ_{WM} and ν_L) allowing an evaluation of the quality of epoxidized long chain fatty acid ester plasticizers as a replacement of phthalate based plasticizers in PVC compositions. The epoxidized methyl- and isopropylesters of long chain fatty acids mentioned among other plasticizers in D2 correspond to the primary plasticizers as defined in claim 1 of the main request.

4.1.2 The passage on the second half of page O3 and on the first part of page O4 suggests that epoxidized long chain fatty acid esters may be mixed with "other substances" in order to improve the quality of the plasticizer systems. The passage on page O4 further indicates that epoxidized methyl- and isopropyl esters of long chain fatty acids with an epoxide content of more than 5% could be suitable as primary plasticizers, the next sentence disclosing that experimental studies confirmed that commercially available epoxidized plasticizers such as epoxidized vegetable oils were usable as secondary plasticizers. That passage alludes to but does not constitute a specific disclosure of a composition of a plasticizer system comprising an epoxidized methyl- and isopropyl ester of a long chain fatty acid as primary plasticizer in combination with a secondary plasticizer, let alone an epoxidized soy oil. Also, no reference is made in D2 that would identify the experimental studies concerning the referred secondary plasticizers and in addition to that point,

it is undisputed that epoxidized soy oil, an essential feature of claim 1 of the main request, is not disclosed in D2.

4.1.3 While on the one hand plasticizer mixtures based on combinations of epoxidized fatty acid esters with substances leading to less gelification can be derived from D2, and on the other hand the use of epoxidized vegetable oils as secondary plasticizers is also disclosed, a combination of an epoxidized fatty acid methylester with an epoxidized vegetable oil is not explicitly and unambiguously disclosed in that document. Thus, the question of whether the skilled person would have understood the term epoxidized vegetable oils in the first paragraph of page O4 as epoxidized soy oil does not need to be answered to establish that claim 1 of the main request is novel over D2.

4.1.4 Claim 2, which is dependent on claim 1, claims 3-4, which pertain to compositions comprising a plasticiser system according to claims 1 or 2, and claim 5, which pertains to a cable comprising the plasticized polymer composition according to claims 3 or 4 are therefore also novel over D2.

4.2 D4

4.2.1 The content of D4 resembles that of D2 in that both documents contain most of the same graphs. D4 is however in many instances more sketchy than D2 since its explicative content is in the form of bullet points on powerpoint slides and is thus not as detailed as the text forming the content of D2.

4.2.2 D4 relates to modified esters of fatty acids as plasticizers for PVC (slides 1 to 3). The title of slide 4 suggests that the topic of the presentation was the substitution of modified fatty acid esters for phthalates in plasticized PVC used for selected applications. If the second point on slide 4 suggests that the properties of PVC compositions may be adjusted by the chemical structure and the composition of modified fatty acid esters, epoxidized vegetable oils and their mixtures, it does not disclose any of the specific components listed as primary plasticizer in claim 1 of the main request.

4.2.3 Regarding the generic disclosure of modified fatty acid esters, slide 9 (first two points) and slide 10 (list) do teach the use of epodixized fatty acid esters of short chain akyl groups, among which methylester, as primary plasticizers. In that respect, slide 9 and slide 10 of D4 disclose a primary plasticizer as claimed in claim 1 of the main request. These slides, however, do not disclose a mixture of a primary plasticizer with a secondary plasticizer as claimed.

4.2.4 Slide 17 of D4 concerns the time dependent evolution of the viscosity of selected PVC compositions. It is therein disclosed that epoxidized fatty acid ester with an epoxide number of more than 5,5% leads to a strong gelification when it is dispersed in PVC. The two graphs of that slide show measurements of the viscosity as a function of time for several PVC compositions containing each a different plasticizer, among them are epoxidized linseed and soy methylesters (eLME and eSME). While the last point on slide 17 appears to suggest a mixture with plasticizers causing less gelification, there is no clear and unambiguous disclosure of any specific mixture of plasticizers on

that slide and no mention of an epoxidized soy oil either. The mixture of plasticizers alluded in slide 17 can also not be found in slides 11 and 12. These slides contain graphs of the critical solution temperature (KLT) for several plasticizers and identify epoxidized fatty acid ethylhexylesters (epo-FS-EHE) and epoxidized (vegetable) oils (epo-Öle) as plasticizers having less gelifying properties. There is however no indication in D4 that the slides 11 or 12 should be read in combination with slide 17. There is thus no clear and unambiguous disclosure in D4 that epoxidized vegetable oils are referred to in slide 17.

4.2.5 Slide 25 discloses that epoxidized methyl- and isopropylesters of long chain fatty acids are suitable as primary plasticizers in PVC compositions and that the gelifying properties of these epoxidized esters increase with their epoxide number. A further point made in slide 25 is that epoxidized fatty acid methylester having an epoxide number of more than 5% is more gelifying than Di-Ethylhexyl Phthalate (DEHP). Slide 25 also contemplates adjusting the viscosity of PVC compositions through the use of mixtures of plasticizers. Another point made in slide 25 is that because epoxidized fatty acid ethylhexylesters (epo-FS-EHE) and epoxidized (vegetable) oils (epoxidierte-Öle) are less gelifying, they can be used as secondary plasticizers. Slide 25 is thus merely a summary of teachings made of the previous slides of D4.

4.2.6 As far as combinations of plasticizers are concerned, the content of slide 25 remains ambiguous since it is left open whether its intent is only to provide a conclusion regarding the establishment of a classification of epoxidized compounds as primary and secondary plasticizers or whether admixtures of these

two different types of plasticizers are effectively taught. Slide 25 can therefore not be seen as clearly and unambiguously disclosing a mixture of epoxidized (vegetable) oils with epoxidized fatty acid methylesters. That slide does also not provide a basis for a combination of different plasticizers disclosed in separate parts of D4, such as epoxidized fatty acid methylesters on the one hand and epoxidized (vegetable) oils on the other hand.

4.2.7 Under these circumstances, the question of whether the skilled person would have understood the term epoxidized vegetable oils used throughout D4 as epoxidized soy oil is not relevant to the novelty of claim 1 of the main request over D4.

4.2.8 Claim 2, which is dependent on claim 1, claims 3-4, which pertain to compositions comprising a plasticiser system according to claims 1 or 2, and claim 5, which pertains to a cable comprising the plasticized polymer composition according to claims 3 or 4 are therefore also novel over D4.

4.3 The Board concludes from the above that neither D2 nor D4 take away the novelty of claims 1 to 5 of the main request.

5. Inventive step

5.1 The object of the patent in suit was to provide plasticizers used in polymers to create desired physical characteristics in the resulting polymer/ plasticizer complex, such as increasing flexibility, pliability, and plasticity in the resultant polymer complex (paragraph 1).

5.2 D4 was considered as representing the closest prior art in the contested decision of the opposition division. In the statement setting out the grounds of appeal, the appellant briefly mentions that both D4 or alternatively D2 could be used as closest prior art, but only submitted arguments in view of D4 (passage bridging pages 10 and 11 of the statement setting out the grounds of appeal). Since the statement of grounds of appeal does not make it clear whether the decision of the opposition concerning the choice of D4 as the document representing the closest prior art is contested in appeal and since it does not contain arguments in support of D2 as the closest prior art, the Board does not see a reason to deviate from the decision of the opposition division to select D4 as the document representing the closest prior art.

5.3 As discussed above under point 4.2 under novelty, D4 concerns modified esters of fatty acids as plasticizers for PVC. With respect to the patent in suit, the starting point in D4 is the summary slide 25. That slide discloses the use of epoxidized fatty acid methylester as primary plasticizer. Furthermore, a combination of plasticizers to adjust the rheological properties of PVC compositions is suggested on the same slide. Slide 25 however does not explicitly disclose the combination of epoxidized fatty acid methylester with epoxidized vegetable oils, let alone epoxidized soy oil.

5.4 The patent in suit contains four examples concerning the use of a plasticizer system in a PVC composition.

5.4.1 Among these examples, example 3 and comparative example 4 were seen by the respondent as being relevant to the question of inventive step of the main request.

In these two examples a simplified PVC electrical cable jacket formulation was produced from a polyvinyl chloride homopolymer, calcium carbonate, a Zn/Ca stabilizer and an antioxidant. The composition of example 3 is further based on a plasticizer system consisting of an equal amount of epoxidized biodiesel and epoxidized soy oil. The composition of example 3 can be seen as representing the subject matter of claim 1 of the main request. By contrast, the composition of comparative example 4 is based on epoxidized biodiesel as the sole plasticizer in an equal amount as the plasticizer system used in example 3. The composition of comparative example 4 can be seen as representing the closest prior art D4.

5.4.2 The thermal stability of two specimen produced from the compositions of example 3 and comparative example 4 was tested by measuring the percentage elongation retained after each formulation was subjected to ageing at 100°C for 10 days, whereby to achieve desired industry performance, the aged specimen must retain a minimum of 65% of the initial elongation.

5.4.3 While the composition representing claim 1 of the main request (example 3) achieves a retention value of 73%, above the desired industry performance, the composition representing the closest prior art D4 (comparative example 4) only achieves a retention value of 50%, below the desired industry performance. In that respect, the examples of the patent in suit demonstrate the presence of an improved retention of the initial elongation upon ageing of PVC compositions obtained with the claimed plasticizer systems.

5.5 D16 is a test report filed by the respondent showing the change in colour of PVC compositions containing

epoxidized soy oil (ESO) or epoxidized fatty acid methyl ester (eFAME) as plasticizers used alone or in combination as part of a plasticizer system. The table in D16 shows the change in colour after 7 days of ageing at 50°C and 80% relative humidity of PVC compositions containing a 50-50 mixture of epoxidized soybean oil and epoxidized fatty acid methyl ester as compared to PVC compositions containing either plasticizer alone. The results reported in D16 show that resistance to ageing of PVC compositions as evidenced by their change of colour is less pronounced for the composition based on a plasticizer system (ESO and eFAME) than for compositions based on one plasticizer (ESO or eFAME) only. The effect of the plasticizer on the colouration of the PVC compositions as reported in D16 however is not derivable from the patent in suit. Paragraphs 3 and 5 of the patent concern the need of developing plasticizers imparting thermal stability to PVC compositions as compared to phthalate plasticizers. An effect resulting from the selection of plasticizer systems on the colouration of PVC compositions is nowhere suggested in the patent in suit. D16 can therefore not be taken into account for the definition of the problem solved over the closest prior art.

5.6 D15 is a test report filed by the appellant containing three examples of PVC compositions comprising epoxidized plasticizers. Examples 1 and 2 of D15 replicate example 3 and comparative example 4 of the patent in suit in that they contain a plasticizer system comprising epoxidized biodiesel and epoxidized soy oil (example 3) or epoxidized biodiesel alone (comparative example 4). D15 also includes example 3 which utilises epoxidized linseed oil rather than epoxidized soy oil in a plasticizer system comparable

to that of example 2. The results reported in Table 2 of D15 show that the retention of the percentage elongation of specimen obtained from PVC compositions based on plasticizer systems comprising epoxidized soy oil or epoxidized linseed oil are comparable (67% in the case of epoxidized soy oil and 71% in the case of epoxidized linseed oil) and that both satisfy the requirement regarding the retention of the initial elongation of the specimen as set out in the patent in suit (above 65%). In that respect, D15 establishes that the use of epoxidized linseed oil as a secondary plasticizer in these PVC compositions is comparable to the use of epoxidized soy oil as far as retention of the initial elongation upon ageing is concerned. Since D15 does not report the values of elongation of example 1 relating to the composition containing the primary plasticizer only, that experimental report does not contradict or even call into question the examples provided in the patent in suit. Also, since D15 does not contain any other data that could have supported the argument of the appellant that the claimed plasticizer system did not provide any improvement over other secondary plasticizers in general, the Board concludes that D15 is therefore not relevant to the definition of the technical problem solved over the closest prior art D4.

5.7 The problem that can be derived from the experimental evidence made available to the Board is thus the provision of improved retention of the initial elongation upon ageing of plasticized PVC compositions.

5.8 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 D4 and in particular from the information disclosed in slide 25

of that document. The question posed is whether the skilled person would have arrived at a plasticizer system according to claim 1 of the patent in suit.

5.9 The closest prior art D4 suggests in several instances admixing less gelifying substances or plasticizers to PVC compositions containing a strong gelifying primary plasticizer such as an epoxidized fatty acid ester having an epoxy number of more than 5% (slides 4, 17 and 25). That teaching however is only made in relation to a possible adjustment of the viscosity of the PVC composition in D4 and it does not mention epoxidized soy oil. In that respect, the teaching of D4 does not relate to the problem posed. It would thus not have prompted a skilled person to add an epoxidized soy oil as a secondary plasticizer in the PVC compositions of D4 to solve the problem posed.

5.10 D12 and D14 do not change that conclusion for the following reasons:

5.10.1 D12 is an excerpt of the "handbook of polyvinyl chloride formulating" that discusses types of epoxy plasticizers and in particular epoxidized vegetable oils. D12 teaches that soy oil is the predominant base of epoxidized vegetable oil plasticizers but it does neither mention their use as secondary plasticizer nor suggest that they may improve the retention of elongation of PVC compositions upon ageing.

5.10.2 D14 is a marketing research report that was published (2009) after the priority date of the patent in suit (15 February 2008). Since the priority of the patent in suit was not contested, D14 is not a valid prior art for the patent in suit and it cannot be used in combination with D4 to deny the inventive step of the

claimed subject-matter. Besides, D14 was cited to show that epoxidized soy oil was the predominant epoxidized vegetable oil. In that respect, D14 is not more relevant than D12 and cannot hint at the claimed solution to the problem as posed.

5.11 D8 and D9 cited by the appellant concern flame retardant PVC compositions (D8) or electrical grade PVC compositions (D9). D8 more specifically concerns PVC compositions based on the presence of a phthalate plasticizer (claim 1, column 5, lines 39-51). In this respect, D8 would not have been considered by the skilled person since the main object of the patent in suit as well as that of D4 is the development of PVC compositions that are phthalate free (paragraph 5 of the patent in suit, Slide 4 of D4). It is also clear that the passage cited in D8 (column 8, line 62 to column 9, line 58) pertains to the addition of an epoxidized soy oil as a secondary plasticizer in PVC compositions that are based on phthalate plasticizers. The teaching of D8 regarding the use of epoxidized soy oil as secondary plasticizer in these compositions is therefore not relevant to the patent in suit and to the closest prior art D4.
D9 (column 5, lines 58-59) discloses that epoxidized soy oil can be used as heat stabilizer in PVC compositions. D9 neither discloses the use of epoxidized soy oil as secondary plasticiser, nor is related to the problem of the retention of the initial elongation upon ageing and, thus, it cannot provide a hint to solve the technical problem identified above.

5.12 The Board concludes from the above that the skilled person would not have added epoxidized soy oil to the PVC compositions of D4 in order to solve the problem posed. Therefore, the subject matter of claim 1 of the

main request is inventive over D4.

5.13 Claim 2, which is dependent on claim 1, claims 3-4, which pertain to compositions comprising a plasticiser system according to claims 1 or 2, and claim 5, which pertains to a cable comprising the plasticized polymer composition according to claims 3 or 4 are therefore also inventive over D4.

5.14 The main request satisfies 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 O. Dury

Decision electronically authenticated