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Datasheet for the decision of 2 June 2016

Case Number: T 2513/12 - 3.3.03

Application Number: 05774413.8

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IPC: C08G59/18

Language of the proceedings: EN

Title of invention:
EPOXY RESINS WITH IMPROVED ELASTICITY

Patent Proprietor:
ALLNEX AUSTRIA GmbH

Opponent:
Momentive Specialty Chemicals Research Belgium S.A.

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - main request (yes)

Decisions cited:

Catchword:

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Case Number: T 2513/12 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 2 June 2016

Appellant: (Opponent)	Momentive Specialty Chemicals Research Belgium S.A. Avenue Jean Monnet 1 1348 Ottignies Louvain-la-Neuve (BE)
Respondent: (Patent Proprietor)	ALLNEX AUSTRIA GmbH Bundesstrasse 175 8402 Werndorf (AT)
Representative:	Deckers, Hellmuth Alexander European Patent Attorney Breitbachstrasse 15 55218 Ingelheim am Rhein (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 30 October 2012 rejecting the opposition filed against European patent No. 1802677 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	F. Rousseau
Members:	O. Dury
	R. Cramer

Summary of Facts and Submissions

I. The appeal by the opponent lies against the decision of the opposition division rejecting the opposition filed against European patent No. EP 1 802 677.

II. The granted patent contained 12 claims, of which claims 1, 9, 11 and 12 read:

"1. A process for the production of epoxy resins **AB** comprising, in their polymer chain, moieties derived from hydroxy functional aliphatic polyethers **B1** having at least 4 carbon atoms in the alkylene group or from hydroxy functional aliphatic polyesters **B2** based on linear, branched or cyclic aliphatic polyhydric alcohols **B21** and linear, branched or cyclic aliphatic polyvalent acids **B22**, where the average number of hydroxyl or acid groups in **B21** or **B22** is at least 1.9, comprising the steps of

- reacting in the first step, at least one of hydroxy functional aliphatic polyethers **B1** and hydroxy functional aliphatic polyesters **B2**, with a a [sic] linear, branched or cyclic aliphatic dicarboxylic acid **B4**, where the amounts of substance of **B1**, **B2** and **B4** are chosen such that the amount of substance of carboxyl groups in **B4** is at least 1.9 times the sum of the amount of substance of hydroxyl groups in **B1** and **B2**,

- reacting, in the second step, the acid functional product of the first step with an aromatic dihydroxy compound and an epoxide component having at least two epoxy groups per molecule, in an advancement reaction to form the epoxy resins **AB**."

"9. A process for the production of epoxy resins **ABC**

with an incorporated reaction product **C** of an aliphatic polyol **C1** with an epoxy resin **C2** which has at least two epoxy groups per molecule, comprising the steps of

(a) preparation of an emulsifier by reaction of an aliphatic polyol **C1** of a number average molar mass M_n of from 200 g/mol to 20 000 g/mol, having a mass fraction of oxyethylene units in its structure of at least 20 %, preferably a polyoxyethylene glycol or a hydroxy functional copolyether comprising oxyethylene and oxypropylene groups, with an epoxide compound **C2** having at least two epoxy groups per molecule, the ratio of the number of hydroxyl groups in **C1** to the number of epoxy groups in **C2** being from 1 : 0.85 to 1 : 7, which reaction is preferably conducted in the presence of a catalyst such as Lewis acids or complexes thereof,

(b) reacting a hydroxy functional aliphatic polyether **B1** or a hydroxy functional aliphatic polyester **B2** made by polycondensation of aliphatic polyhydric alcohols **B21** and linear, branched or cyclic aliphatic polyvalent acids **B22**, where the average number of hydroxyl or acid groups in **B21** or **B22** is at least 1.9, with a dicarboxylic acid **B4** or an anhydride **B4'** thereof, under formation of a carboxyl group terminated intermediate.

(c) reacting this intermediate in mixture with a polyhydric phenol with an epoxy resin which forms the polyether structure A under ring opening and formation of an ester bond through the action of the carboxylic acid groups on the epoxy groups, in the presence of a catalyst such as triphenyl phosphine

(d) adding the emulsifier C and water to achieve the desired mass fraction of solids of from about 40 % to

about 65 %."

"11. A method of use of the epoxy resins **AB** made by the process of claim 1, comprising mixing the epoxy resin AB with a curing agent selected from the group consisting of acid curing agents, aminic curing agents having at least one primary or secondary amino group or at least two tertiary amino groups, and applying the mixture to a substrate selected from the group consisting of metal sheets, plastic sheets, concrete, and curing the applied layer."

"12. A method of use of the epoxy resins **AB** made by the process of claim 1 or epoxy resins **ABC** made by the process of claim 9, comprising formulating adhesives, coating compositions, sealing compositions or fillers, which are cured by curatives selected from the group consisting of latent curatives, solvent borne curatives, and aqueously dispersed curatives, and applying the same to substrates selected from the group consisting of metals and concrete."

Claims 2 to 8 and claim 10 were dependent claims directed to embodiments of claim 1 and claim 9, respectively.

III. A notice of opposition to the patent was filed, in which the revocation of the patent on the grounds of Art. 100(a) EPC (lack of novelty and of inventive step) was requested.

IV. In its decision the opposition division held among others that the claims of the granted patent were novel over D1 (US 5 612 394) and inventive starting from D1 as closest prior art.

V. The opponent (appellant) lodged an appeal against the above decision. In its statement setting out the grounds for the appeal the appellant requested that the patent be revoked and submitted

D8: "Alkyd Resin", Encyclopaedia Britannica Online, 2013 (1 page)

VI. By letter of 5 July 2013, the respondent (patent proprietor) requested that the appeal be dismissed. Three auxiliary requests as well as the following document were simultaneously filed:

D9: Lackkunstharze, H. Wagner and H.F. Sarx, 5. Auflage, 1971, pages 16-17

VII. In a communication issued on 29 July 2013 questions were raised by the Board regarding the admissibility of the appeal.

VIII. By letter of 5 August 2013 the appellant submitted arguments related to the admissibility of the appeal.

IX. By letter of 1 September 2015 the parties were summoned to oral proceedings to be held on 2 June 2016.

X. In a communication issued on 4 January 2016 the Board identified relevant issues to be addressed during the oral proceedings.

XI. With letter of 18 April 2016, the appellant announced that he would not attend the oral proceedings but that the request and arguments submitted earlier were maintained.

XII. At the end of the oral proceedings, held on 2 June 2016 in the absence of the appellant, the Board announced its decision.

XIII. The appellant's arguments, as far as relevant for the present decision, may be summarised as follows:

Main request - Inventive step

The problem to be solved over the closest prior art D1 was to provide alternative epoxy resin dispersions based coatings with elastic properties. D1 taught that the modification of such epoxy resin dispersion by an alkyd resin provides improved elasticity. It was further known from D8, which reflected common general knowledge, that alkyd resins based on polyester could have carboxyl end groups and, thus, be reactive towards epoxy functional groups. Therefore, the combination of D1 and D8 obviously led to the granted claims.

XIV. The respondent's arguments, as far as relevant for the present decision, may be summarised as follows:

Main request - Inventive step

The epoxy resins defined in granted claims 1 and 9 differed from those according to the closest prior art D1 in the nature of the modifying moieties derived from B1/B2. D1 merely taught to add an alkyd resin to the aqueous epoxy resin dispersions disclosed therein but contained no hint to make modifications as defined in granted claims 1 and 9.

D8, which was not a valid prior art, taught that if alkyd resins were to contain carboxyl end groups, they could be crosslinked with epoxy groups. However,

crosslinked resins were not suitable for making films, as explained in D9. Therefore, the skilled person aiming at preparing epoxy resins suitable for making coatings, even if he were to consult D8, would not have been motivated to react epoxy resin with a polyester having carboxyl groups. D8 rather taught away from the solution provided by the granted claims.

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

The respondent (patent proprietor) requested that the appeal be dismissed (main request) or, alternatively, that the decision under appeal be set aside and the patent be maintained in amended form on the basis of one of auxiliary requests 1-3 filed with letter of 5 July 2013.

Reasons for the Decision

1. In view of the reply to the Board's communication of 29 July 2013 provided by Mr. de Cock with letter of 5 August 2013 the Board is satisfied that the notice of appeal was filed by the opponent. This was not disputed by the respondent. Therefore, the appeal is admissible.

2. The appellant was duly summoned to oral proceedings but did not attend, as announced, and the oral proceedings were continued in its absence in accordance with Rule 115(2) EPC, the appellant being treated as relying only on its written case (Art. 15(3) RPBA).

Main request (patent as granted)

3. The novelty objections raised in the first instance proceedings were not pursued by the appellant in appeal. The Board has no reason to examine novelty of its own motion.

4. Inventive step

4.1 Closest prior art

4.1.1 According to paragraphs 1, 3 and 21, the patent in suit relates to a process for the production of epoxy resins with improved elasticity as well as of aqueous dispersions of such elastic epoxy resins, and to the use of those elastic epoxy resins and aqueous dispersions thereof as adhesives, coatings or sealing materials having good corrosion protection.

4.1.2 Such compositions are known from D1, which was considered by both parties as the closest prior art.

D1 discloses a process for preparing aqueous epoxy resin dispersions comprising (A) an optionally modified epoxy resin, (B) a dispersant, (C) a polymer prepared in a dispersion of (A) and (B), opt. (D) a curing agent for the epoxy resins and opt. (E) additives and catalysts, in which the optionally modified epoxy resin (A) is a condensation product of (A-1) epoxide compounds, (A-2) aromatic polyols and optionally (A-3) modifying compounds containing at least two epoxide reactive groups and which are not classifiable under (A-2) (D1: claims 1, 11, 15, 16). A list of suitable modifiers (A-3) is disclosed in col. 6, lines 22-41 of D1. Such a modified epoxy resin is prepared in example 8 of D1 (col. 15, lines 8-17).

The epoxy resins of D1 are suitably used as coating compositions for coating the interior of containers intended for the storage of foodstuffs and beverages and should, among others, protect the container material against aggressive components such as acids. Besides, said coatings should satisfy a combination of properties for that use, in particular good elasticity (D1: col. 1, lines 5-26; col. 5, lines 1-9; col. 14, lines 4-10).

4.1.3 In view of the above, D1 is a suitable starting point.

4.2 Problem solved over the closest prior art

4.2.1 Both parties considered that the problem effectively solved over D1 is to provide further epoxy resin dispersions based coatings with elastic properties, which corresponds to the conclusion drawn by the opposition division (decision: page 6, section 17).

4.2.2 In the present case, the patent in suit contains two independent process claims 1 and 9, which are directed to the preparation of epoxy resins AB and ABC, respectively.

a) The epoxy resin AB according to granted claim 1 is a product comprising moieties A derived from an epoxide component having at least two epoxy groups per molecule and moieties B derived from an "acid functional product" obtained by reaction of (B1 and/or B2) with B4 as defined in granted claim 1. The "acid functional product" is prepared according to the first step of claim 1. The epoxy resin AB is prepared according to the second step of claim 1 by reacting in an advancement reaction said epoxide component, the "acid

functional product" and an aromatic dihydroxy compound.

It was clarified during the oral proceedings before the Board that no example illustrative of the subject-matter of granted claim 1 is contained in the patent in suit and/or is on file. In particular the sole examples of the patent in suit are carried out using an anhydride B4' (and not a dicarboxylic acid B4 as mentioned in granted claim 1) and with an emulsifier (which is not explicitly mentioned in granted claim 1). However, there is neither evidence on file showing that embodiments according to granted claim 1 would not solve the above identified problem, nor was it ever argued by the appellant. Besides, considering the similarity in terms of chemical reactivity between a dicarboxylic acid (B4) and an anhydride thereof (B4') and the function of an emulsifier in coatings, it is credible that, as argued by the respondent during the oral proceedings before the Board, the effects shown in the examples of the patent in suit would also be obtained with epoxy resins prepared according to granted claim 1.

b) Regarding granted claim 9, considering that component C is an emulsifier, "epoxy resin ABC" effectively means a mixture of an epoxy resin AB with an emulsifier C. The emulsifier C is prepared according to step a) of claim 9. The epoxy resin is prepared according to steps b) and c) of claim 1 by reacting an epoxy resin ("which forms the polyether structure A under ring opening " as indicated in step (b) of granted claim 9), a "carboxyl group terminated intermediate" and a polyhydric phenol. The "carboxyl group terminated intermediate" is further obtained according to step (b) of claim 9 by reaction of (B1 or B2) with (B4 or B4’) as defined in claim 9, whereby the

definitions of B1 and B4 are not identical with those of B1 and B4 according to claim 1.

Examples 3 and 5 of the patent in suit illustrate the subject-matter of granted claim 9, wherein the component prepared in example 1 of the patent in suit correspond to step b) of granted claim 9 using poly(oxy-1,4-butylene) glycol as B1, toluylene diisocyanate as B3 (see paragraphs 9, 10, 12 and 17-18 of the patent in suit) and phthalic anhydride as B4'. It is shown in Table 1 of the patent in suit that such resin dispersions exhibit good elasticity. Although said examples 3 and 5 only illustrate one of the alternatives encompassed by granted claim 9, there is neither evidence on file showing that other embodiments according to granted claim 9 would not solve the above identified problem, nor was it ever argued by the appellant. Besides, as explained above in respect of granted claim 1, it is credible that the effect shown with an anhydride B4' would also be obtained with the corresponding dicarboxylic acid B4.

4.2.3 Under such circumstances, the formulation of the problem effectively solved over D1 as formulated by the parties (see 4.2.1) is acceptable.

4.3 Solution

The solution resides in the processes according to granted claims 1 and 9.

In that respect, there is no evidence on file that D1 discloses an "acid functional product" according to the first step of claim 1 or a "carboxyl group terminated intermediate" according to step b) of claim 9. In particular, it was not shown that any of the modifying

compounds (A-3) taught in D1 (col. 6, lines 22-42; example 8) corresponded to said "acid functional product" or "carboxyl group terminated intermediate". Also, no evidence was provided to refute that conclusion, which had already been drawn by the opposition division (section 10.2 of the decision).

Therefore, the subject-matter of claims 1 and 9 differs from D1 at least in the chemical nature of those modifiers for the epoxy resins.

4.4 Obviousness

4.4.1 The question to be answered is if the skilled person desiring to solve the above identified problem would, in view of the prior art, have modified the disclosure of D1 in such a way as to arrive at the claimed subject matter.

4.4.2 The appellant argued that D1 disclosed at col. 12, lines 11-12 that alkyd resins could be used as additional curable binder.

a) However, the passage at col. 12, lines 9-12, of D1 is directed to curable binders which correspond to component (E) of D1, which are to be added to the dispersion comprising epoxy resin (A), dispersant (B), polymer (C) prepared in a dispersion of (A) and (B) as well as the optional curing agent (D) for the epoxy resins (D1: col. 11, line 60, to col. 12, line 4). This means that the alkyd resins usable as curable binders are not used in D1 in an advancement reaction during the preparation of the epoxy resin, as is the case for the modifiers "acid functional product" or "carboxyl group terminated intermediate" defined in granted claims 1 and 9, but as crosslinkers for the epoxy resin

(A).

b) In addition, it is derivable from the whole paragraph at col. 11, line 66, to col. 12, line 12, of D1 (see in particular "such resins" and "For example" at col. 12, lines 7 and 9) that the alkyd resins mentioned at col. 12, lines 11-12, are the "hydroxy alkyds" specified earlier (col. 12, line 3) i.e. alkyd resins with hydroxyl endgroups. In that respect it was neither shown that those hydroxy alkyd resins could correspond to an "acid functional product" or "a carboxyl group terminated intermediate" as defined in granted claims 1 and 9. Under such circumstances, it cannot be concluded that the hydroxy alkyd resins taught in D1 are in any manner related to the subject-matter of granted claims 1 or 9, in particular to the modifiers prepared in the first step of granted claim 1 ("acid functional product") or in step b) of granted claim 9 ("carboxyl group terminated intermediate").

4.4.3 The appellant's objection was based on the combination of D1 with D8, which is held by the appellant to teach that it was known in the art that alkyd resins could have carboxyl endgroups.

However, considering that D8 is dated 2013 i.e. after either the priority date (2004) or the filing date (2005) of the patent in suit, the question arises whether or not D8 is a valid prior art, which was contested by the respondent.

In the Board's view, it was shown in section 4.4.2 above that the teaching of D1 regarding the alkyd resins mentioned at col. 12, lines 3-12 of D1 was i) directed to hydroxy alkyds i.e. alkyd resins with hydroxyl endgroups (and not carboxyl endgroups as held

to be disclosed in D8) and ii) was not directed to their use in an advancement reaction (as in granted claims 1 and 9). Therefore, even if D8 were to be considered as a valid prior art, i.e. to the appellant's benefit, its combination with D1 would neither be obvious, nor would it lead in an obvious manner to the subject-matter of granted claims 1 or 9. Under these circumstances, the issue of whether or not D8 reflects the general knowledge in the art at the date of priority or filing of the patent in suit is not decisive and can be left unanswered.

4.4.4 Furthermore, there is no evidence on file that "acid functional products" or "carboxyl group terminated intermediates" as defined in granted claims 1 or 9 are known in the art as suitable modifiers in an advancement reaction with an epoxide component.

4.4.5 Under such circumstances the skilled person starting from D1 would have had no motivation to solve the above identified technical problem by replacing the modifier (A-3) of D1 (e.g. as used in example 8) by an "acid functional product" or a "carboxyl group terminated intermediate" according to either granted claim 1 or granted claim 9 and/or to use such an "acid functional product" or a "carboxyl group terminated intermediate" as further modifier for the epoxy resins according to D1.

4.5 For those reasons, the subject-matter of process claims 1 and 9 of the patent in suit is inventive. The same applies to each of claims 2 to 8 and 10, which all depend on claims 1 and 9 and to claims 11 and 12 which are directed to methods of use of epoxy resins made by the process of either claim 1 or claim 9.

5. The respondent (patent proprietor)'s main request being allowable, there is no need to consider the auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. ter Heijden F. Rousseau

Decision electronically authenticated