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Datasheet for the decision of 25 September 2009

Case Number: T 1246/07 - 3.3.03

Application Number: 96301437.8

Publication Number: 0747433

IPC: C08L 61/24

Language of the proceedings: EN

Title of invention:
A catalytic composition and method for curing urea-formaldehyde resin

Patentee:
Hexion Specialty Chemicals, Inc.

Opponent:
BASF SE

Headword:
-

Relevant legal provisions:
EPC Art. 108, 56
EPC R. 101(1)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Appeal of appellant opponent - inadmissible"
"Interpretation of Claim 1 as granted"
"Inventive step - main request (yes)"

Decisions cited:
-

Catchword:

-

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Case Number: T 1246/07 **-** 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 25 September 2009

Appellant: (Opponent)
BASF SE
Global Intellectual Property
GVX-C006
D-67056 Ludwigshafen (DE)

Representative:
-

Appellant: (Patent Proprietor)
Hexion Specialty Chemicals, Inc.
180 East Broad Street
Columbus OH 43215 (US)

Representative:
Knowles, James Atherton
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 30 May 2007 concerning maintenance of European patent No. 0747433 in amended form.

Composition of the Board:

Chairman: R. Young
Members: W. Sieber
C.-P. Brandt

Summary of Facts and Submissions

I. The mention of the grant of European patent No. 0 747 433, in respect of European patent application No. 96301437.8, in the name of Borden Chemical Inc. (now Hexion Specialty Chemicals Inc.), filed on 4 March 1996 and claiming priority from US 469824 (6 June 1995), was published on 24 September 2003 (Bulletin 200/39). The granted patent contained 30 claims, whereby Claim 1 read as follows:

"A binder composition comprising a mixture of:

a first aqueous solution comprising at least one buffering salt catalyst, the first aqueous solution having a pH of from 3.5 to 8.5, the pH being into or below the buffering range of the buffering salt catalyst to both activate the catalytic effect and to minimise or eliminate the buffering action of the salt catalyst; and

a second aqueous solution comprising urea and formaldehyde resin having a urea:formaldehyde molar ratio ranging from 0.7 to 1.67:1,

wherein the second aqueous solution comprises from 10 to 40 weight % of free urea;
wherein the amount of the at least one buffering salt in the mixture equals 0.05 to 15 percent of the weight of the second aqueous solution, and from 0 to 2 weight percent of the second aqueous solution is free formaldehyde.

Claim 15 related to a method of achieving rapid cure of urea-formaldehyde resins comprising the steps of mixing the two aqueous solutions as defined in Claim 1. Claims 2 to 14 and 16 to 30 were dependent claims directed to elaborations of the binder composition of Claim 1 and the method of Claim 15, respectively.

II. A notice of opposition was filed on 23 June 2004 by BASF AG (now BASF SE) (opponent) requesting revocation of the patent in its entirety on the grounds that the claimed subject-matter was neither novel (with respect to a prior use and written disclosure) nor inventive (Article 100(a) EPC).

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

D1,2: Security data sheet for curing agent 26 powder dated 6 September 1993;

D1,6: Product specifications for Kaurit® glues dated 17 June 1994;

D1,7: Letter from Mr Th. Stumpf dated 12 April 2005 including a PRISMA data sheet;

D1,8: Letter from Mr K. P. Schneider dated 20 June 2005;

D1,10: Technical information sheet entitled "Kaurit® Leim 325 flüssig", September 1989;

D2: CA 1 067 638 A;

D4: EP 0 324 293 A1;

D5: English translation of JP 61-89003 A;

D6: US 2 313 953 A; and

D9: EP 0 053 762.

III. At the oral proceedings of 29 May 2006 before the opposition division, the proprietor filed an auxiliary request 1 having 14 claims whereby Claim 1 of this auxiliary request read as follows:

"1. A method of achieving rapid cure of urea-formaldehyde resin comprising the steps of:

mixing a first aqueous solution comprising at least one buffering salt, the first aqueous solution having a pH of from 4 to 6, the pH being into or below the buffering range of the buffering salt catalyst to both activate the catalytic effect and to minimise or eliminate the buffering action of the salt catalyst,

with a second aqueous solution comprising urea and formaldehyde resin in a molar ratio of from 0.7 to 1.1:1,

wherein the second aqueous solution comprises from 10 to 30 weight percent of free urea to form a binder; wherein the amount of the at least one buffering salt in the first aqueous solution equals 0.05 to 15 weight percent of the weight of the second aqueous solution, and 0 to 2 weight percent of the second aqueous solution is free formaldehyde."

Claims 2 to 14 were dependent claims directed to elaborations of the method of Claim 1.

IV. By an interlocutory decision which was issued in writing on 30 May 2007, the opposition division decided that the claims of the main request, ie the claims as granted, were novel (both with respect to the alleged public prior use occurring with the sale of curing agent 26 and Kaurit® binder 325 and with respect to documents D1,10, D2, D4 to D6) but lacked inventive step in view of D1,10 in combination with D9. On the other hand, the claims of auxiliary request 1 met the requirements of the EPC.

Having regard to the main request, ie the claims as granted, the opposition division interpreted Claim 1 as being directed to a mixture obtained from two aqueous solutions and further investigated as to whether or not a particular feature of these solutions was limiting on the resulting mixture.

V. Notices of appeal against the above decision were filed on 30 July 2007 by the proprietor and on 7 August 2007 by the opponent, the required fee being paid on the respective same day.

VI. On 5 October 2007, the appellant proprietor filed the statement of grounds of appeal and requested that the interlocutory decision of the opposition division be set aside and that the patent be maintained in the form in which it was granted. In the alternative, it was requested that the patent be maintained on the basis of one of auxiliary requests 1, 2, 3 (filed together with the statement of grounds of appeal) or auxiliary

request 4 (corresponding to the claims as found allowable by the opposition division in their interlocutory decision dated 30 May 2007).

The arguments of the appellant proprietor may be summarized as follows:

Whether or not the raising of the interpretation issue only at the oral proceedings was an irregularity in procedure, in any event, each of these features of the claims would have a clear meaning to the skilled person so that the interpretation to the extent discussed by the opposition division was neither necessary nor appropriate. Raising the interpretation issue was akin to introducing a lack of clarity objection in relation to the granted claims of the opposed patent, which was, of course, not a ground of opposition.

As regards document D1,10, the appellant proprietor submitted that there must be some doubt whether this document was available to the public before the priority date of the opposed patent. Further, there had to be serious doubts whether the nature of the relevant products referred to in D1,10, namely curing agent 26 and Kaurit® binder 325, had been made public before the priority date of the patent in suit.

The opposition division was wrong in starting from D1,10 for the assessment of inventive step because D1,10 did not relate (unlike the patent in suit) to the problem of reducing the cure time and was associated with a public prior use (at least because of the use of products allegedly sold before the priority date of the patent in suit). Moreover, D6 was the closest prior art

to the subject-matter of Claim 1 as granted because D6 related to the use of formaldehyde resins in wood products.

One of the main problems addressed by the contested patent was the acceleration of cure in binder compositions. There seemed to be no clear discussion in D6 that would induce the skilled person to address this problem. The disclosures in D6 relating to the speed of cure would give the skilled person no clear teaching to address the underlying problem. In fact, the teaching at page 2 would teach the skilled person away from acceleration of cure because it was indicated in that passage that condensing and polymerisation too soon was unsatisfactory for the purpose intended. Of course, even if the skilled person were (for some unknown reason) to seek to address the acceleration of cure problem, he would be unable to approach the subject matter of any of the claims because neither D6 nor any of the other cited documents suggested providing a first aqueous solution with a pH into or below the buffering range of the buffering salt catalyst to both activate the catalytic effect and to minimise or eliminate the buffering action of the salt catalysts. Consequently, it was quite clear that the subject-matter of the granted claims involved an inventive step in view of the prior art cited by the opponent.

VII. By a communication dated 25 October 2007 sent by registered letter with advice of delivery, the registry of the board informed the appellant opponent that no statement of grounds of appeal had been filed and that the appeal could be expected to be rejected as

inadmissible. The appellant opponent was invited to file observations within two months.

VIII. With a letter dated 5 August 2009, the appellant opponent stated that it would not attend the oral proceedings scheduled for 25 September 2009.

IX. With a letter dated 14 September 2009, the appellant proprietor submitted a statement from Dr William K. Motter (an inventor of the patent in suit) in support of arguments made in the statement of grounds of appeal.

X. On 25 September 2009, oral proceedings were held before the board where the respondent, as announced, was not represented. Since it had been duly summoned, however, the oral proceedings were continued in its absence in accordance with Rule 115(2) EPC and Article 15(3) RPBA (OJ EPO 2007, 536).

(a) The appellant proprietor maintained its requests submitted with the statement of grounds of appeal (see point VI, above).

(b) As regards the admissibility of the appeal of the appellant opponent the board indicated that this appeal appeared to be inadmissible (Article 108 EPC in conjunction with Rule 101(1) EPC). The appellant proprietor did not comment on this issue.

(c) With regard to the interpretation of Claim 1 as granted the board pointed to the finding in the decision under appeal that Claim 1 as granted had to be interpreted as a "product-by-process" claim. This interpretation was approved by the appellant

proprietor as well as the opposition division's interpretation that the definition of the first aqueous solution in Claim 1 as granted ("the pH being into or below the buffering range of the buffering salt catalyst to both activate the catalytic effect and to minimise or eliminate the buffering action of the salt catalyst") implied an adjustment of the pH of the buffer-catalyst solution. The appellant proprietor emphasized that the modification of the butter salt in order to minimize or eliminate the salt's buffering action (ie "stressing" the buffer) was in fact the essential feature of the claimed invention.

(d) The appellant proprietor agreed with the opposition division that the subject-matter of the claims as granted was novel over the alleged prior use and the cited prior art.

(e) As regards inventive step, the appellant proprietor maintained its view that D6 had to be considered as the closest prior art. None of the cited prior art documents disclosed an adjustment of the buffer. The fact that such an adjustment of the buffer ("stressing" the buffer) led to accelerated cure was clearly evident from the comparison of Example 2 (no stressed buffer) with Example 6 (stressed buffer) in the patent in suit.

XI. The requests of the appellant proprietor are set out in point VI, above. The appellant opponent did not file any request.

Reasons for the Decision

1. *Admissibility of the appeals*

1.1 The appeal of the appellant proprietor is admissible.

1.2 The appellant opponent has not filed a written statement setting out the grounds of appeal and the notice of appeal contained nothing that could be regarded as a statement of grounds of appeal pursuant to Article 108 EPC. Consequently, the appeal of the appellant opponent is rejected as inadmissible (Article 108 EPC in conjunction with Rule 101(1) EPC).

Main request (claims as granted)

2. *Interpretation of Claim 1 as granted*

2.1 Claim 1 as granted (point I, above) is directed to a binder composition comprising a mixture of a specified first aqueous solution and a specified second aqueous solution. The opposition division interpreted Claim 1 as granted as being "directed to a mixture **obtained** from two aqueous solutions" (point 6.2 of the reasons of the decision under appeal, paragraph bridging pages 6 and 7, emphasis by the board). Since it is in principle not possible to distinguish between a first and a second solution in the claimed binder composition (for example, how could it ever be possible to attribute a specific amount of water to the first and second solution, respectively), the board agrees with the opposition division that the truth of the matter of Claim 1 lies in the idea of mixing a specified first aqueous solution with a specified second aqueous

solution in order to form the claimed binder composition. Thus, Claim 1 as granted has to be regarded as a concealed product-by-process claim although it is devoid of the usual wording of such a claim type ("… obtainable by …"). At the oral proceedings before the board, also the appellant proprietor agreed with this interpretation of Claim 1 as granted.

2.2 According to Claim 1 as granted, the pH of the first aqueous solution is "into or below the buffering range of the buffering salt catalyst to both activate the catalytic effect and to minimise or eliminate the buffering action of the salt catalyst". This definition implies according to the decision under appeal (point 6.2 of the reasons, page 7, 2nd paragraph) that the first aqueous solution contains an acidic component in addition to the buffering salt catalyst, since an acidic component is necessary to minimize or eliminate the buffering action of the salt catalyst. This is indeed confirmed by the description of the opposed patent where it is stated at page 4, lines 15-17 that "It is important to pre-adjust the pH of the aqueous buffer-catalyst solution significantly into or below its buffering range, to both activate the catalytic effect, and to minimize or eliminate the salt's buffering action." Further it is stated at page 5, lines 47-49: "Then, sufficient acid is added to the aqueous solution to provide the aqueous solution with a pH of about 2.0 to about 8.5, preferably about 3.5 to about 6, more preferably about 4 to about 6 and most preferably about 4 to about 5."

Further it is apparent from the decision under appeal (point 6.2 of the reasons, page 7, 2nd paragraph) that this understanding of Claim 1 as granted was also common ground between the parties. At the oral proceedings before the board, the appellant proprietor emphasized that the modification of the buffer salt in order to minimize or eliminate the salt's buffering action (ie "stressing" the buffer) was in fact the essential feature of the claimed invention.

In view of the above, the board sees no reason to depart from the interpretation of Claim 1 as granted in this respect.

2.3 Since Claim 1 as granted has to be regarded as a "product-by-process" claim where the binder composition is defined in terms of its manufacture, namely obtainable by mixing a first aqueous solution containing a "stressed" buffer salt catalyst with a second aqueous solution, the relevant questions to be asked with respect to such a product claim are (i) whether the prior art discloses such a preparation of a binder composition or (ii) whether there exists a binder composition in the prior art which has, despite being prepared in a different way, the same characteristics and/or properties as the claimed binder composition.

Under these circumstances a further investigation which value the parameters required in the two aqueous solutions (eg the pH of the first aqueous solution or the free urea and free formaldehyde content of the second solution) will adopt in the final mixture is neither necessary nor appropriate. The interpretation

of Claim 1 as granted to the extent discussed by the opposition division is likely to distract from the relevant questions (i) and (ii) and therefore counterproductive.

3. *Novelty*

It has not been demonstrated during the opposition and the opposition appeal proceedings that (i) the cited prior art (ie the alleged public prior use occurring with the sale of curing agent 26 and Kaurit® binder 325 or documents D1,10, D2, D4 to D6) discloses the preparation of a binder composition as set out in Claim 1 as granted or (ii) there exists a binder composition in the cited prior art which has the same characteristics and/or properties as the claimed binder composition. Hence, the board agrees with the finding of the opposition division that the subject-matter of Claim 1 as granted, and, by the same token, the subject-matter of Claims 2-30 as granted is novel over the cited prior art.

It may be appropriate to recall at this juncture that the opponent never challenged the opposition division's finding with respect to novelty. In fact, the opponent did not file any submissions in the appeal procedure at all.

4. *Inventive step*

4.1 Claim 1 as granted relates to a binder composition comprising urea-formaldehyde resins (UF resins) and a modified ("stressed") buffer salt, whereby the latter is used to speed cure of the UF resins (paragraph [0001]

of the patent in suit). Furthermore, it is stated in paragraph [0005] of the patent in suit that "it is advantageous to impart faster cure to UF resins. The time required during the pressing stage is usually the deciding factor which limits the total possible production in most wood composite panel manufacturing processes. Therefore, any catalyst which can speed cure, ie which will impart improved performance properties at shorter press times, is desired. Shortening the press time by only a few seconds can result in considerable increases in profits to board manufacturers."

4.2 There was a dispute as to whether D1,10 or D6 should be regarded as the closest prior art, whereby the opposition division relied on D1,10. According to the appellant proprietor D1,10 was not available to the public before the priority date of the patent in suit and, therefore, considered D6 to represent the closest prior art.

4.2.1 D1,10 is a technical information sheet produced by BASF entitled "Kaurit® Leim 325 flüssig" (Kaurit® glue 325 liquid). It carries in the left upper corner the date "September 1989", and further indicates that this technical information sheet replaces the issue of June 1987. D1,10 discloses in Table 3 a chemical formulation for veneer overlays containing *inter alia* 100 parts by weight Kaurit® glue 325 liquid and 10 parts by weight of a 20% solution of curing agent 26. However, D1,10 is silent as to the properties curing agent 26 (referred to only once in the document, namely in Table 3) and of Kaurit® glue 325 liquid. In order for the opponent to establish, therefore, that D1,10 is a relevant disclosure, it would also have been necessary to

establish (i) the nature of curing agent 26 and Kaurit® glue 325, and (ii) that they were available to the public.

Regarding (i) the opponent supplied evidence of the nature of curing agent 26 (D1,2; ammonium phosphate) and Kaurit® glue 325 (D1,6; urea-formaldehyde resin, U:F = 1.35, 2-10% free urea, < 0.5% free formaldehyde). Regarding (ii), the evidence supplied by the opponent relating to the public availability of curing agent 26 and Kaurit® glue 325 was contained in D1,7 and D1,8. D1,7 contains a letter from a BASF employee stating that curing agent 26 and Kaurit® glue 325 were sold to Wetzel GmbH & Co. KG in 1993 and 1994. Dl,8 from Wetzel GmbH & Co. KG states that curing agent 26 was obtained from BASF in 1993 and 1994 and used in their experimental laboratory and by their (unnamed) clients for curing of, for example, Kaurit® glue 325.

The appellant proprietor raised numerous objections against the evidence provided by the opponent which prevented D1,10 from being used as the closest prior art. First of all, it was argued that document D1,10 as such was not available to the public. Furthermore, it has not been proven that at the date of Dl,10 (1989) the product referred to as curing agent 26 was ammonium phosphate nor that Kaurit® glue 325 was the resin specified in Dl,6 (D1,2 and D1,6 were dated 1993 and 1995, respectively). In view of the different ages of the evidence, there had to be serious doubt that this evidence could be validly combined with D1,10. Further, D1,6 was a product specification for Kaurit® glue 325 and other glues. The ranges provided in D1,6 were not equivalent to a disclosure in, for example, a patent

document of a preferred range. A range in a product specification, eg the specified range for free urea, was an indication of the acceptable limits within which a product may lie. There was no indication that a sample of Kaurit® glue 325 with 10 wt% free urea (ie the tiniest possible overlap between this feature in Claim 1 as granted and the range (2 to 10%) in D1,6) has ever been made. Finally, at the oral proceedings before the board, the appellant proprietor even challenged that ammonium phosphate was a buffer.

If one assumes, in favour of the opponent, that D1,10 was available to the public before the priority date of the patent in suit (and the date indicated in D1,10 supports this view) and that Kaurit® glue 325 liquid mentioned in Table 3 of D1,10 corresponds to the second aqueous solution of Claim 1 as granted and curing agent 26 is a buffer, D1,10 can indeed be regarded as the closest prior art. This document belongs to the same technical field as the claimed subject-matter and equally refers to the curing of UF resins, a particular issue of the patent in suit. However, there is no evidence whatsoever in D1,10 that the pH of the buffer was (or had to be) adjusted to minimise or eliminate the buffering action of the salt catalyst. Thus, the claimed subject-matter differs at least in this respect from D1,10.

A technical effect relating to this distinguishing feature, according to the appellant proprietor the key feature of the claimed invention, is derivable from a comparison of Examples 2 and 6 in the patent in suit. These examples describe the preparation of particleboards where a first aqueous solution

comprising dipotassium phosphate (DPP) as a buffer salt catalyst is combined with a second aqueous solution comprising UF. In Example 2, DPP was used without any adjustment to minimise or eliminate the buffering action of DPP, ie no pH adjustment of the first aqueous solution, the buffer was not "stressed". Therefore, Example 2 corresponds to the disclosure of D1,10 (if one accepts D1,10 as being an acceptable starting point for the assessment of inventive step). In Example 6 on the other hand, the DPP catalyst solution was pre-adjusted to pH 4.0 before adding it to the resin solution, ie the buffer was "stressed". As stated in paragraph [0045] of the patent specification, this removed any buffer influence the catalyst solution may have had without the pH-adjustment. Dry and pressure cooked shear results measured on the obtained particleboards (Tables II and IV) indicate that the "stressed" buffer salt accelerated cure. This means that comparable physical properties were reached in a shorter time.

Thus, the technical problem addressed in the patent in suit, namely increased cure speed, is indeed the objective technical problem to be solved over D1,10 (if one accepts D1,10 as being an acceptable starting point for the assessment of inventive step).

There is no indication in D1,10 or in any other document that the modification of the buffer salt (ie minimising or eliminating the buffering action) would result in an accelerated cure. Consequently, the subject-matter of Claim 1 as granted, and, by the same token, the subject-matter of claims 2-30 as granted is based on an inventive step.

Since even the most favourable consideration of the evidence provided by the opponent with regard to D1,10 leads to the finding that the claimed subject-matter is based on an inventive step, there is no need to enter a discussion as to whether or not this evidence demonstrates up to hilt that D1,10 is indeed an acceptable starting point.

4.2.2 No other conclusion with respect to inventive step is reached if one starts from D6 as the closest prior art.

D6 relates to a process for plasticizing and resinifying wood and other ligno-cellulosic materials. This involves the production of plywood and laminated compressed wood page 1, left hand column, lines 26-27) and also the production of moulded articles from solid wood, from laminated wood and from plywood (page 1, left hand column, lines 39-41). On page 1, right hand column, lines 39-46 it is stated that it is possible to secure a preliminary softening and a final resinification of the wood by use of a single aqueous treating solution consisting of urea and/or thiourea, together with an aldehyde and/or suitable other chemicals such as, for instance, furfurylalcohol, in the presence of suitable buffers and catalysts. On page 2, left hand column, five typical urea solution formulae are disclosed of which only three (I, II and IV) contain formaldehyde. In each of these three general solutions the ratio of urea to formaldehyde is about 3 to 1, which is outside the range indicated in Claim 1 as granted.

Thus, D6 belongs to the same technical field as the claimed subject-matter and refers to curing in the presence of a catalyst and a buffer. Apart from the fact that D6 does not disclose an urea to formaldehyde resin ratio as required in Claim 1, there is no clear disclosure of the pH and there is no disclosure in D6 that the buffering salt is adjusted to minimise or eliminate the buffer effect.

It has already been demonstrated in the discussion of D1,10 that the distinguishing feature "minimising or eliminating the buffer effect" improves the cure rate. Thus, the objective technical problem over D6 can still be seen in the provision of increased cure speed.

There is nothing in D6 itself which would provide an incentive to the skilled person to modify the buffer in order to solve the posed problem. On the contrary, it appears from the passage bridging pages 1 and 2 of D6, that a buffer is used to retard the curing. That passage states: "A solution composed of only urea and/or thiourea and an aldehyde in the presence of a suitable catalyst, but without a buffer, would be unsatisfactory for the purpose intended because it would start condensing and polymerising too soon. Therefore for most of the purposes contemplated in my invention a catalyst and a buffer must be added." In fact, these remarks would teach the skilled person away from accelerating cure at all. Since, furthermore, there is no indication in the other cited documents that the modification of the buffer would result in an accelerated cure, the subject-matter of Claim 1 as granted and, by the same token, the subject-matter of

Claims 2-30 as granted is based on an inventive step when starting from D6 as the closest prior art.

5. Since the appellant proprietor succeeded on his main request, there is no need to discuss the further auxiliary requests.

Order

For these reasons it is decided that:

1. The appeal of the opponent is rejected as inadmissible.

2. The decision under appeal is set aside.

3. The patent is maintained unamended.

The Registrar: The Chairman:

E. Görgmaier R. Young