

**Internal distribution code:**

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

**Datasheet for the decision  
of 2 February 2024**

**Case Number:** T 1386/22 - 3.3.03

**Application Number:** 13005303.6

**Publication Number:** 2730689

**IPC:** C09J101/28, C09J103/02,  
C09J105/00, D04H1/4218,  
D04H1/587, D21H23/48,  
C08L61/20, D21H17/20, C08K7/14,  
D04H1/4242, D04H1/64,  
D21H13/40, C08L61/32, C08L61/24

**Language of the proceedings:** EN

**Title of invention:**  
VISCOSITY MODIFIED FORMALDEHYDE-FREE BINDER COMPOSITIONS

**Patent Proprietor:**  
Johns Manville

**Opponent:**  
Knauf Insulation

**Relevant legal provisions:**  
EPC Art. 56  
RPBA 2020 Art. 12(4)

**Keyword:**

Inventive step - obvious solution - optimisation of parameter  
Amendment to case - request - reasons for submitting amendment  
in appeal proceedings (yes)



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 1386/22 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 2 February 2024**

**Appellant:** Knauf Insulation  
(Opponent) Rue de Maastricht 95  
4600 Visé (BE)

**Representative:** ARC-IP  
ARC-IP sprl  
Rue Emile Francqui 4  
1435 Mont-Saint-Guibert (BE)

**Respondent:** Johns Manville  
(Patent Proprietor) 717 Seventeenth Street  
Denver, CO 80202 (US)

**Representative:** Patentanwälte Olbricht Buchhold Keulertz  
Partnerschaft mbB  
Bettinastraße 53-55  
60325 Frankfurt am Main (DE)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 31 March 2022  
rejecting the opposition filed against European  
patent No. 2730689 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** D. Semino  
**Members:** M. Barrère  
A. Bacchin

## Summary of Facts and Submissions

- I. The appeal of the opponent lies against the decision of the opposition division rejecting the opposition against European Patent No. 2 730 689.
- II. The following documents were *inter alia* cited in the decision of the opposition division:
  - O12: US 2008/0083522 A1
  - O13: WO 2011/019597 A1
  - O14: US 2008/0160854 A1
- III. In that decision the opposition division held, among others, that:
  - The subject-matter of claim 1 as granted involved an inventive step over document O13 as the closest prior art.
- IV. The opponent (appellant) filed an appeal against said decision.
- V. With the rejoinder to the statement of grounds of appeal, the patent proprietor (respondent) filed three sets of claims as auxiliary requests 1 to 3.
- VI. Oral proceedings were held before the Board on 2 February 2024.
- VII. The appellant requested that the decision under appeal be set aside and the patent be revoked.

The respondent requested dismissal of the appeal and maintenance of the patent as granted. In the alternative, the respondent requested maintenance of the patent in amended form on the basis of one of the auxiliary requests 1-3 filed with the rejoinder to the statement of grounds of appeal.

VIII. Claim 1 as granted (main request of the respondent) read as follows:

"1. An aqueous carbohydrate binder composition comprising (i) at least one carbohydrate, (ii) at least one nitrogen containing compound and (iii) at least one thickening agent, said thickening agent (iii) being different from the carbohydrate (i) and water,

wherein the binder composition has a Brookfield viscosity of 0.007 to 0.05 Pa\*s (7 to 50 centipoise) at 20°C as measured with a Brookfield viscometer using spindle 18 at 60 rpm and

wherein the nitrogen containing compound comprises (i) a diamine having at least one primary amine group and/or (ii) a reaction product of a urea compound and an aldehyde-containing compound (iii) an ammonium salt of a polycarboxylic acid and/or (iv) a reaction product of an organic anhydride and an alkanol amine."

Claim 1 of auxiliary request 1 differed from claim 1 of the main request in that the nitrogen containing compound comprised:

"a diamine having at least one primary amine group and/or ~~(ii) a reaction product of a urea compound~~

~~and an aldehyde-containing compound (iii) an ammonium salt of a polycarboxylic acid and/or (iv) a reaction product of an organic anhydride and an alkanol amine" (deletions in strikethrough).~~

Claim 1 of auxiliary request 2 was amended with respect to claim 1 of auxiliary request 1 by adding the expression:

"wherein the thickening agent has a concentration of 0.03 wt.% to 0.3 wt.% of the binder composition"

Claim 1 of auxiliary request 3 was amended with respect to claim 1 of auxiliary request 2 by adding the expression:

"and the thickening agent comprises a modified cellulose and/or a polysaccharide and/or acrylic acid"

The remaining claims of these requests are not relevant to this decision.

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

(a) Main request (patent as granted) and auxiliary request 1

The subject-matter of granted claim 1 lacked an inventive step over document O13 as the closest prior art. The same applied to claim 1 of auxiliary request 1.

(b) Auxiliary requests 2 and 3

(i) Admittance

Auxiliary requests 2 and 3 should not be admitted into the proceedings.

(ii) Inventive step

The subject-matter of claim 1 of auxiliary request 2 lacked an inventive step over document O13 as the closest prior art. The same applied to claim 1 of auxiliary request 3.

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

(a) Main request (patent as granted) and auxiliary request 1

The subject-matter of granted claim 1 involved an inventive step over document O13 as the closest prior art. The same applied to claim 1 of auxiliary request 1.

(b) Auxiliary requests 2 and 3

(i) Admittance

Auxiliary requests 2 and 3 should be admitted into the proceedings.

(ii) Inventive step

The subject-matter of claim 1 of auxiliary request 2 involved an inventive step over document 013 as the closest prior art. The same applied to claim 1 of auxiliary request 3.

## **Reasons for the Decision**

### **Main request (patent as granted)**

#### 1. Inventive step

##### 1.1 Closest prior art and distinguishing features

There was agreement between the parties that document 013 could be regarded as the closest prior art for the subject-matter of granted claim 1. It was also not disputed that the subject-matter of granted claim 1 differed from the binder compositions of 013 in:

- (i) the nature of the nitrogen-containing compound (comprising a diamine having at least one primary amine group and/or (ii) a reaction product of a urea compound and an aldehyde-containing compound (iii) an ammonium salt of a polycarboxylic acid and/or (iv) a reaction product of an organic anhydride and an alkanol amine) and
- (ii) the viscosity of the composition (having Brookfield viscosity of 0.007 to 0.05 Pa\*s).

The Board has no reason to depart from that view. It is in particular pointed out that the viscosity of the compositions of O13 is not known.

1.2 Objective problem to be solved

1.2.1 The appellant held that no technical effect could be attributed to distinguishing features (i) and (ii).

1.2.2 As regards feature (i), the respondent did not contest the conclusion of the opposition division that no technical effect could be associated to the nature of the nitrogen-containing compound (page 14, point 6.3.1 of the decision under appeal).

However, the respondent argued that the opposed patent provided evidence that the choice of a binder viscosity as defined in granted claim 1 (distinguishing feature (ii)) resulted in improved binder distribution in a glass fiber mat associated with improved bonding of the mat top layers (respondent's letter of 30 January 2024 page 1, last two paragraphs and page 2, first paragraph with reference to paragraph [0068] of the patent). During the oral proceedings before the Board, the appellant also submitted that the skilled person knew that the problem of an uneven binder distribution existed, without having to provide evidence.

1.2.3 The Board notes that the experimental data referred to by the respondent show an effect of the compositions according to claim 1 only in comparison with compositions containing no thickening agent (opposed patent, page 10, paragraph [0068] and page 11, table 1). However, it has not been disputed by the parties that the compositions of O13 contain a thickening agent. Consequently, the comparative examples of the

opposed patent are not representative of the teaching of 013 as the closest prior art.

However, on the basis of basic physical considerations (effects of viscosity, surface tension and gravity), the Board accepts that the binder viscosity has an effect on the binder distribution in a glass fiber mat. It is qualitatively reasonable that, on the one hand, too low a binder viscosity results in too much of the free-flowing binder migrating to the bottom of the mat, leaving the fibres at the top with too little binder coverage (opposed patent, paragraph [0006]). On the other hand, too high a viscosity also causes an uneven coating of the mat, as the binder remains in the top layers. In both cases, uneven binder distribution is expected to result in reduced mechanical properties for the bonded fibre mat.

1.2.4 Therefore, based on common general knowledge, the Board can agree with the respondent that the objective problem to be solved may be seen as the provision of a binder composition which can be more evenly distributed over the whole thickness of a fiber mat (thereby improving the mechanical properties of the final product).

### 1.3 Obviousness

The parties did not contest the conclusion of the opposition division that the choice of a nitrogen-containing compound as defined in claim 1 (distinguishing feature (i)) was obvious in view of the cited prior art. The Board has therefore no reason to deviate from that view (page 14, point 6.3.1 of the decision under appeal).

It remains to be assessed whether it was obvious to a person skilled in the art wishing to improve the binder distribution in a fiber mat (thereby improving the mechanical properties of the final product) to adjust the binder viscosity in the range of 0.007 to 0.05 Pa\*s as defined in claim 1.

- 1.3.1 The appellant considered that the skilled person would adapt the binder viscosity according to the needs. It would therefore be obvious to adjust the viscosity in order to solve the above problem. In addition, documents O12 and O14 provided guidance to select a viscosity in the range defined in claim 1.
- 1.3.2 The respondent argued that documents O12, O13 and O14 did not disclose a binder viscosity as defined in claim 1. Furthermore the skilled person would not even consider the teaching of O12 and O14 as these documents related to binder chemistries different from the one in O13.
- 1.3.3 The Board notes that O13 is silent as to the viscosity of the binder compositions disclosed therein. Nevertheless, a person skilled in the art wishing to follow the teaching of O13 would have to arbitrarily select a binder composition within the ambit of O13 and thereby implicitly select a viscosity. However, as stated above (point [1.2.3](#) of the reasons), it is notorious that the viscosity cannot be too low or too high in order to achieve an even distribution of the binder on a fiber mat. In that regard, it is emphasised that no evidence was required to acknowledge this effect.
- 1.3.4 Consequently, the skilled person, knowing that the viscosity can neither be too high nor too low, would

have to adjust the viscosity of the binder composition to the substrate to be coated by means of routine experimentation. It follows that optimising the viscosity in order to achieve a uniform distribution of the binder in a fiber mat (thereby improving the mechanical properties of the final product) is a routine activity for the skilled person. In other words, the identification of a viscosity suitable for the purpose of the claimed invention, cannot involve an inventive step, in particular if the effect associated with this optimisation is obvious to the skilled person. In this respect, it was not disputed by the parties that O13 (page 7, lines 3 to 24) disclosed the use of thickeners to improve the properties of glass fiber mats, thus providing guidance to adjust the viscosity.

Furthermore, in assessing the question of obviousness, the Board does not depart from the established case law, according to which it is part of the activities deemed normal for the skilled person to optimise a physical dimension in such a way as to achieve an acceptable compromise, serving the intended purpose, between two effects which were contingent in opposing ways on this dimension (Case Law of the Boards of Appeal, 10th edition 2022, I.D.9.17).

Last but not least, contrary to the respondent's view, the Board considers that the skilled person does not need any indication of a suitable viscosity range in the prior art, since the problem (uneven binder distribution) and the method of solving it (adjusting the viscosity) are obvious.

- 1.4 For these reasons, distinguishing features (i) and (ii) are obvious for the person skilled in the art and the

subject-matter of granted claim 1 does not involve an inventive step over O13 alone.

### **Auxiliary request 1**

2. The respondent accepted at the oral proceedings that the conclusion on inventive step regarding the main request would equally apply to auxiliary request 1. For the sake of completeness, it is merely noted that the choice of a diamine having at least one primary amine group (constituting the additional limitation of claim 1 of auxiliary request 1) is known from O13 (page 5, lines 30 to 35). Accordingly, the subject-matter of claim 1 of auxiliary request 1 also lacks an inventive step over O13 as the closest prior art.

### **Auxiliary requests 2 and 3**

3. Admittance
  - 3.1 Auxiliary requests 2 and 3 were submitted by the respondent with the rejoinder to the statement of grounds of appeal. The admittance of these requests into the appeal proceedings underlies the provisions of Article 12, paragraphs (4) to (6) RPBA.
  - 3.2 The appellant contested the admittance of auxiliary requests 2 and 3 on the grounds that:
    - no justification had been provided in the rejoinder to the statement of grounds of appeal for the filing of auxiliary requests 2 and 3 only in appeal;
    - these requests should have been submitted during opposition proceedings.

3.3 During the oral proceedings before the Board, the respondent argued that auxiliary requests 2 and 3 were filed in response to a new experimental report submitted by the appellant with the statement of grounds of appeal. The Board notes that this report was provided in support of an objection of lack of novelty. While this novelty objection is not the subject of the present decision, the filing of additional auxiliary requests further limiting the scope of the claims is considered to be a timely and appropriate reaction to a new submission of the appellant in relation to a novelty objection. Consequently, the Board has no reason to consider that the respondent should have filed auxiliary requests 2 to 3 during the opposition proceedings.

3.4 Under these circumstances, the Board finds it appropriate to exercise its discretion under Article 12(4) RPBA by admitting auxiliary requests 2 and 3 into the proceedings.

4. Inventive step

4.1 Claim 1 of auxiliary request 2 was amended with respect to claim 1 of auxiliary request 1 by adding the expression:

"wherein the thickening agent has a concentration of 0.03 wt.% to 0.3 wt.% of the binder composition".

In addition, in claim 1 of auxiliary request 3, it was specified that:

"the thickening agent comprises a modified cellulose and/or a polysaccharide and/or acrylic acid".

4.2 With regard to auxiliary request 2, the respondent argued that the amount of thickening agent constituted a further distinguishing feature between the subject-matter of claim 1 of auxiliary request 2 and the disclosure of document O13. The problem to be solved was the provision of a binder composition which can be more evenly distributed over the whole thickness of a fiber mat (thereby improving the mechanical properties of the final product). Finally, it was not obvious for a skilled person to combine a viscosity as defined in claim 1 with an amount of thickening agent between 0.03 wt.% to 0.3 wt.% of the binder composition.

4.3 The Board does not contest that the amount of thickening agent can formally be seen as an additional distinguishing feature in view of the lack of a disclosure of this feature in combination with the other features of operative claim 1 in document O13 as a whole. Although it has not been argued that the opposed patent provides evidence of an effect linked to the amount of thickener, the definition of the objective problem proposed by the respondent is nevertheless accepted for the reasons explained in relation to the main request (point 1.2 above). However, the assessment of the submissions on obviousness by the respondent in view of the additional feature of claim 1 of auxiliary request 2 cannot be followed for the following reasons:

As noted by the appellant, document O13 (page 7, lines 22 to 24) teaches that the amount of thickener and/or rheology modifier being present in the binder

composition is most preferably from 0.05 to 0.1 weight percent corresponding to an amount as defined in claim 1 of auxiliary request 2. It follows that it was obvious to the skilled person wishing to put the teaching of O13 into practice to select an amount of thickener within the range of present claim 1. As regards the obviousness of the viscosity range, the considerations in relation to the main request apply *mutatis mutandis* to auxiliary request 2 (point 1.3.3 above). It is further pointed out that the amount of thickening agent and the viscosity of the composition are interrelated parameters so that the skilled person need only adjust the former to control the latter.

- 4.4 For these reasons, also the additional distinguishing feature of present claim 1 of auxiliary request 2 is obvious for the person skilled in the art and the subject-matter of this claim does not involve an inventive step over O13 alone.
- 4.5 The respondent had no additional argument as far as claim 1 of auxiliary request 3 was concerned. For the sake of completeness, it is merely noted that the choice of a modified cellulose as thickening agent (corresponding to the additional limitation of claim 1 of auxiliary request 3) is a preferred embodiment of O13 (page 7, lines 18 to 20). Accordingly, the subject-matter of claim 1 of auxiliary request 3 also lacks an inventive step over O13 as the closest prior art.
5. As none of the respondent's requests is allowable due to lack of inventive step, there is no need to deal with any other issue and the patent is to be revoked.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated