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**Datasheet for the decision
of 24 October 2008**

Case Number: T 0047/06 - 3.3.03

Application Number: 99919130.7

Publication Number: 1084167

IPC: C08G 8/04

Language of the proceedings: EN

Title of invention:

Stabilized aqueous phenolic binder for mineral wool and
production of mineral wool products

Patentee:

Rockwool International A/S

Opponent:

SAINT-GOBAIN ISOVER

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 111(1)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Novelty - yes"
"Inventive step - yes"
"Decision re appeal - exercise of power"

Decisions cited:

T 0198/84, T 0026/85

Catchword:

-



Case Number: T 0047/06 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 24 October 2008

Appellant: Rockwool International A/S
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated 20 September 2005
and posted 18 November 2005 revoking European
patent No. 1084167 pursuant to Article 102(1)
EPC.

Composition of the Board:

Chairman: R. Young
Members: M. C. Gordon
E. Dufrasne

Summary of Facts and Submissions

I. Mention of the grant of European Patent No. 1 084 167 in the name of Rockwool International A/S in respect of European patent application No. 99919130.7, filed on 18 May 1999 as international application No. PCT/DK99/00274, published as WO 99/60042 on 25 November 1999, and claiming priority of DK 0679/98 of 18 May 1998, was announced on 4 September 2002 (Bulletin 2002/36) on the basis of 27 claims, claim 1 of which read as follows:

"A stabilized aqueous phenolic binder for mineral wool comprising an emulsified phenolic resin consisting essentially of a phenolic resin having a degree of conversion of phenol of 99% or more, said binder containing a protective colloidal agent in a concentration of less than 0.1% by weight based on the solid content of the binder."

Claims 2-13 were directed to preferred embodiments of the binder of claim 1.

Claim 9 in particular read as follows:

"A binder according to any one of claims 1-8, wherein the phenolic resin consists essentially of the reaction product of phenol and aldehyde in a phenol to aldehyde molar ratio of less than 1:1"

Claim 14 was an independent method claim and read as follows:

"A method of producing an emulsifiable phenolic resin comprising:

a) reacting a phenolic component, with formaldehyde, in the presence of an effective amount of an alkaline catalyst for a sufficient reaction time and at a

suitable temperature to provide a degree of conversion of phenol of 99% or more,

b) cooling the reaction mixture to stop further condensation, and

c) adding less than 0.1% by weight of a protective colloidal agent."

Claims 15 and 16 were directed to preferred embodiments of the method of claim 14.

Claim 17 was directed to the product obtainable by the method of claims 14 to 16.

Claim 18 was a method claim and read as follows:

"A method of producing a stabilized aqueous phenolic binder for mineral wool comprising providing an emulsifiable phenolic resin as defined in claims 1-13, or obtainable by the method as claimed in claims 14-16; adjusting the pH in the range of 7 to 10 and adding an effective amount of water to form a two-phase system."

Claims 19-21 were directed to preferred embodiments of the method of claim 18.

Claim 22 was directed to the product obtainable by the method of claims 18-21.

Claim 23 was directed to the use of a binder according to claims 1-13 in the production of mineral wool products.

Claim 24 was directed to a method of producing a mineral wool product and read as follows:

"A method of producing a mineral wool product, said method comprising the steps of:

a) providing a stabilized phenolic binder according to claims 1-13;

b) applying the binder to the mineral wool; and

c) curing the binder in the mineral wool."

Claim 25 was directed to a preferred embodiment of the method of claim 24, and claim 26 to the mineral wool

product obtainable by the method of claims 24 or 25. Claim 27 was directed to a mineral wool product containing 0.5-12 % by weight of binder according to claims 1-13 or claim 22.

II. A notice of opposition to the patent was filed on 4 June 2003 by Saint-Gobain Isover. The grounds of opposition pursuant to Art. 100(a) EPC were invoked, namely that the subject matter claimed was not novel (Art. 54 EPC) and did not involve an inventive step (Art. 56 EPC).

The opponent relied on the following documents:

D1: US-A-5 670 571;

D2: US-A-5 371 140;

D3: US-A-4 748 214 and

D4: Kirk-Othmer Encyclopedia of Chemical Technology, volume 15, pp. 204-205 (1968)

which were referred to by the opponent as "A1" to "A4" respectively.

III. By a decision announced orally on 20 September 2005 and issued in writing on 18 November 2005 the opposition division revoked the patent. This decision was based on the patent as granted (main request) as well as sets of claims forming a first, second, third and fourth auxiliary request. The first auxiliary request had been filed with a letter dated 19 July 2005. The second, third and fourth auxiliary requests were filed in the course of the oral proceedings before the opposition division.

(a) The decision held that the subject matter of the claims according to the main request, i.e. the claims of the patent as granted lacked novelty.

(i) It was held that D1 disclosed an aqueous dispersion of an emulsified novolac resin stabilized by the addition of a protective colloid in an amount of **about** 0.1% to **about** 8% by weight based on the amount of novolac solids (Board's emphasis). Because the range was disclosed in terms of "about", applying the principles of T 175/97 (14 March 2000, not published in the OJ EPO), the value *inter alia* of 0.09 was included within the claimed range.

According to the decision the proprietor had argued that example 7(I) of D1 did not anticipate the subject matter of operative claim 1 because the amount of the protective colloid (casein) was at least six times superior to the claimed range.

The decision also explained why submissions of the patent proprietor that:

- the patent was directed to emulsions and not to dispersions, the term "emulsion" excluding the presence of a solid phase (minutes of the oral proceedings before the opposition division, page 4, 2nd paragraph; decision under appeal section V.1.4.3);
- there was no overlap between "less than 0.1 wt. %" as defined in the claim and "about 0.1 wt. %" as specified in D1, and that the purpose of selecting an amount of protective colloid agent lower than 0.1 wt. % was to improve reduced emission of phenol and ammonia as could be seen from Table 2 of the patent specification (decision under appeal, sections V.1.3 and V.1.4.3)

were not found to be convincing.

With respect to the term "emulsions" it was held that an appropriate, commonly accepted definition of the term "emulsion" was provided by "Glossary of Chemical Terms", pp. 94, 95 (Hampel C.A. and Hawley, G.G.), a document distributed at the oral proceedings by the opposition division and attached to the decision and minutes. This specified that under the term "emulsion" was meant a permanent suspension or dispersion, usually of oil or fat particles in water or an aqueous medium. Accordingly, it was held that the aqueous dispersion of small particles of phenolic resin disclosed in D1 was an "emulsion". Thus the interpretation of the patent proprietor of the meaning of the term "emulsion" as being a liquid in a liquid was refuted.

With regard to the content of protective colloid, the submission that the lower range of "about 0.1 %" did not overlap with "less than 0.1%" was refuted by reference to T 175/97, which stipulated that where no other margins were given, the maximum margin should be ascertained by applying the rounding off convention to the last decimal place, thus 0.09% was within the claimed range.

Thus D1 anticipated the subject matter of claim 1.

- (ii) D2 disclosed an emulsifiable phenolic resin composition comprising a mixture of a resole

resin and an emulsifying agent without claiming any particular range. Thus it was supposed that the lower limit of the range was superior to 0 and the upper limit was 100%. At col. 13, lines 26-29 it was disclosed that the preferred range of emulsifying agent was between 0.1 and 5 weight % of the total resin solids and further indicated that the phenolic resin system lost emulsifiability at levels below 0.1 wt. %. This statement was held to imply that tests had been carried out at such levels.

The opposition division held that the teaching of D2 was perfectly reproduced in Table 1 of the patent in suit which showed that a content of emulsifying agent below 0.1 wt. % resulted in stability evaluated as "yes" whereas a content of 0.1 wt. % resulted in "very" stable dispersions. A quantity of only 0.002 wt. % however gave a stability of 8 minutes which was below the threshold of 20 minutes designated "satisfactory" according to the examples of the patent.

The opposition division thus considered the teaching of the patent in suit to be within the line of teaching of D2, which thus was considered to foretell the claimed invention and its effects.

It was held that the subject matter claimed could not be considered to be a selection from the disclosure of D2 (with reference to T 198/84 OJ EPO 1985, 209). Although the

selected subrange (less than 0.1 %) was held to be narrow with respect to the disclosure of D2 ("between 0.1 to 5 %"), it was not sufficiently far removed from the known range as disclosed in D2. Further, it was held not to constitute a purposive selection since:

- The evidence of the patent showed that stabilized resins were not obtained at protective colloid levels of 0.002 wt. % thus there was no new technical teaching compared to the range claimed in D2. Further, there was no data on the strength of products containing this level of protective colloid.
- With regard to properties such as binder tensile strength and delamination strength (Tables 3 and 4 respectively of the patent in suit), the single test performed using an amount of protective colloid within the claimed range, namely 0.03 wt. % showed that properties were maintained compared to products containing no protective colloid. However there were no stability data for compositions with this level of protective colloid.
- Thus there was no evidence demonstrating that the lower amount of the protective colloid resulted in any particular properties.

Accordingly the subject matter of the claims was not considered to constitute a novel

selection over the disclosure of D2.

With regard to a submission of the proprietor with reference to T 26/85 (OJ EPO 1990, 022) that the disclosure of D2 was not relevant for the assessment of novelty as it concerned a totally different teaching, specifically with reference to the passage at col. 13 lines 4 and 26-28 thereof where it was taught not to work in the claimed range of colloid agent "below 0.1 wt. %" the opposition division held that, with reference to the above cited T 198/84, a definition differing only in wording from the prior art was insufficient to establish novelty. It had to be established whether the state of the art was likely to reveal, i.e. make available to the public, the subject matter of the invention to a skilled person in a technical teaching, which, as explained above, was considered to be the case. Accordingly in view of the conclusions reached in respect of T 198/84, the decision cited by the patent proprietor (T 26/85) was held not to be applicable.

Thus the teaching of the patent was considered to be in line with the teaching of D2 and hence anticipated thereby.

- (iii) Accordingly the subject matter of the main request was considered to lack novelty over the disclosures of D1 and D2.

- (b) Regarding the auxiliary requests:
- (i) The claims according to the first auxiliary request were held not to meet the requirements of Art. 123(2) and (3) EPC.
 - (ii) The claims according to the second auxiliary request were held not to meet the requirements of Art. 123(3) EPC.
 - (iii) The claims of the third and fourth auxiliary requests were held not to meet the requirements of Art. 54 EPC with respect to the disclosure of D2. Novelty over D1 of the subject matter of these requests was however recognised in view of the (amended) feature of claim 1 thereof that the phenolic resin was the reaction product of phenol and aldehyde in a phenol to aldehyde molar ratio of less than 1:1, which feature had been present in claim 9 of the patent as granted (see section I above). D1 however related to novolac resins which were known to be prepared in a molar ratio of formaldehyde to phenol of less than 1.

IV. A notice of appeal against this decision was filed by the patentee, now the appellant, on 13 January 2006, the appeal fee being paid on the same day.

V. The statement of grounds of appeal was filed on 24 March 2006.

Three amended sets of claims forming a main, and a first and second auxiliary request were submitted. None of the sets of claims as considered by the opposition division was maintained. Maintenance of the patent on the basis of one of these sets of claims was requested.

Oral proceedings were requested in the case that the aforementioned request could not be followed based on the written submissions.

The main request consisted of 26 claims. Claim 1 of the main request was a combination of claims 1 and 9 as granted and as originally filed and included the same feature as had been inserted in claim 1 of the third auxiliary request considered by the opposition division in order to distinguish the subject matter thereof from the disclosure of D1 (cf. section III.(b).(iii) above). Claim 1 of the main request thus read as follows, the features derived from claim 9, above being indicated in **bold**:

"A stabilized aqueous phenolic binder for mineral wool comprising an emulsified phenolic resin consisting essentially of a phenolic resin having a degree of conversion of phenol of 99% or more, **the phenolic resin consisting essentially of the reaction product of phenol and aldehyde in a phenol to aldehyde molar ratio of less than 1:1**, said binder containing a protective colloidal agent in a concentration of less than 0.1% by weight based on the solid content of the binder."

Claims 2-8 corresponded to granted claims 2-8.

Claims 9-26 corresponded to granted claims 10-27, with appropriate amendment of the appendances.

(a) With respect to Art. 123(2) and (3) EPC, the appellant submitted that claim 1 of the main request was a combination of claims 1 and 9 as originally filed and as granted.

(b) With respect to Art. 54 EPC the appellant submitted:

(i) D1 was concerned with aqueous dispersions of small solid particles of novolac resins, which were known to be obtainable by

reacting phenol and aldehyde in a molar ratio above 1:1 in the presence of an acidic catalyst.

On the other hand the resoles employed in the invention of the patent in suit were obtained by reacting phenol and aldehyde in a molar ratio of less than 1:1 and in the presence of an alkaline catalyst. This had been recognised in the decision under appeal when discussing auxiliary requests 3 and 4 (see the aforementioned section III.(b).(iii) above).

Consequently there should be no question of lack of novelty over D1.

- (ii) D2 disclosed an emulsifiable phenolic resole resin composition comprising a mixture of a resole resin and an emulsifying agent. This resin was obtained by a process in which an aldehyde and a phenol at a mole ratio of 2.0:1 to 6.0:1 were reacted in the presence of a basic catalyst. According to claims 11 and 12 of D2 suitable emulsifying agents were for example proteinaceous compounds such as casein. According to col. 13, lines 2-5 of D2 the proteinaceous compound was added in the range of about 0.5 to about 20 parts per 100 parts of the resole resin solids. This was above the amount of protective colloidal agent of less than 0.1 wt. % based on the solid content of the binder as defined in the operative claims. It was further taught in D2 (col. 13, lines 20-32) that the preferred quantity of proteinaceous compound was between 0.1 and

5 wt. % of total resin solids, and that below 0.1 wt. % emulsifiability was lost while levels above 5 wt. % were not economic. The appellant considered that these two statements, relating to the permissible content of proteinaceous compound were contradictory.

The passage at col. 13, lines 20-32 of D2 would lead the skilled person to avoid working at a concentration of below 0.1 wt. % as this would risk losing the essential characteristic of water emulsifiability. There was no positive technical teaching in D2 which could be interpreted as an invitation to work at a concentration range of emulsifying agent below 0.1 wt. %. Consequently the opposition division had been incorrect in treating the subject matter claimed as a "selection invention" and in applying the corresponding case law of the Boards of Appeal.

- (c) With regard to inventive step it was submitted, with reference to paragraphs [0012] to [0015] of the patent in suit that the problem to be solved by the invention was to provide an aqueous phenolic binder for mineral wool which during manufacture of the mineral wool product exhibited low emission of polluting low molecular weight compounds, was stable on transport and storage for a suitable time and which exhibited high binding capacity and ensured good product quality in the mineral wool products. This problem was solved by the features of claim 1, *inter alia* the use of a protective colloidal agent (i.e. emulsifying agent)

in a concentration of less than 0.1 wt. % based on the solid content of the binder.

It was submitted that by referring to the last test in Table 1 of the patent, the opposition division had taken the position that the problem had not been solved over the whole range claimed (see section III.(a).(ii) above). It was submitted however that the situation of the patent in suit, with the absence of a lower limit of a component was common in claim drafting. The skilled person would choose an effective amount of the agent, such that evidence showing, for example that 0.0000001% was ineffective would not result in invalidity of the claim. It was submitted that the somewhat reduced stability resulting from use of 0.002% of the protective colloidal agent, shown in Table 1 of the patent would serve as a guideline for determining the effective range.

It was submitted that D2 constituted the closest prior art. This contained a clear teaching to use the emulsifying agent (proteinaceous compound) (i.e. protective colloidal agent) in a concentration of about 0.5 to about 20 parts per 100 parts of resole resin solids. Reference was also made to the statement, said to be "confounding" that the preferred quantity should be between 0.1 and 5% which was dismissed as not matching with the description and examples of D2 (see section V.(b).(ii) above).

However there was nothing in D2 that could be interpreted as a teaching to work at a concentration of emulsifying agent of below 0.1 wt. %. It would constitute hindsight to contend that

the skilled person would ignore the clear teachings of D2:

- (i) not to work at levels below 0.1 wt. % and
- (ii) to work within the range of 0.5 to 20 weight %.

Accordingly an inventive step over D2 should be acknowledged.

VI. In a letter dated 6 August 2008 the opponent - now the respondent - made submissions on the appeal.

(a) With respect to novelty it was submitted that the disclosure in D2 that contents of emulsifying agent below 0.1 wt. % did not lead to the desired result amounted to an explicit disclosure of compositions with a content of emulsifying agent below 0.1 wt. %.

(b) With respect to inventive step it was submitted that, contrary to the submissions of the patentee, the disclosure of D2 with respect to the content of emulsifying agent (between 0.1 and 5 wt. %) was consistent with the teachings of the description and examples. There was no reason to disregard this disclosure. The teaching of D2 was reproduced in Table 1 of the patent in suit.

The stability of the resole resin compositions containing 0.05 wt. % and 0.02 wt. % of casein, classified as "yes" was less good than that of the example containing 0.1 wt. %, classified as "very". The effect linked to a reduction in the quantity of casein on the stability was completely predictable by the skilled person in the light of the teachings of D2. Accordingly the specified content of emulsifying agent of less than 0.1 wt. % was not associated with an inventive step.

(c) Analogously it was submitted that the subject matter of the auxiliary requests 1 and 2 was neither novel nor founded on an inventive step.

VII. The appellant requests:

1. That the decision be set aside and that the patent be maintained on the basis of the set of claims according the main request, or alternatively any of the auxiliary requests;
2. Oral proceedings be arranged if request (1) cannot be followed based on the written submissions.

The respondent requests by implication that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
Although the respondent's submission of 6 August 2008 was filed outside the period allowed for response to the statement of grounds of appeal and therefore does not necessarily form part of the appeal, the Board, in exercise of its discretion has decided to admit this submission for consideration in the appeal proceedings.

Main request

2. *Art 123 (2) and (3) EPC*
- 2.1 The features of claim 1 are a combination of the features of claims 1 and 9 as originally filed and as granted. The features of this claim derived from claim 9 are indicated in bold in the recitation of the claim in section V above.
- 2.2 Claims 2-8 are identical to claims 2-8 as granted.
- 2.3 Claims 9-12 correspond to claims 10-13 as granted with the dependencies being appropriately amended.
- 2.4 Independent claim 13 is identical to independent claim 14 as originally filed and granted (see section I above).
- 2.5 Claims 14-26 correspond to claims 15-27 as granted, with the appendancies being appropriately amended.
- 2.6 Therefore the claims of the main request meet the requirements of Art. 123(2) and (3) EPC.

Novelty

3. According to the decision under appeal, the subject matter of the claims of the patent as granted lacked novelty with respect to the disclosures of D1 and D2 (see section III.(a).(i) and (ii) above).
- 3.1 *The subject matter of claim 1*

3.1.1 The subject matter of operative claim 1 is defined, like that of the third auxiliary request underlying the decision under appeal, *inter alia* by specifying that the molar ratio of phenol to aldehyde in the phenolic resin is less than 1:1, i.e. aldehyde is present in the majority, which feature was present in claim 9 as granted. Accordingly the product formed is a resole resin.

3.1.2 Thus, the subject matter of claim 1 of the main request includes that feature of claim 1 of the third auxiliary as considered by the opposition division which was held to confer novelty over the disclosure of D1 (see sections III.(b).(iii) and V.(b).(i) above.

3.2 *The subject matter of independent claim 13*

Claim 13 (cf section 2.4 above) is directed to a method of producing an emulsifiable phenolic resin involving *inter alia* the reaction of a phenolic component with formaldehyde in the presence of an alkaline catalyst to provide a degree of conversion of phenol of 99% or more (see section I above).

Compared to claim 1 (see section V, above), a single aldehyde - namely formaldehyde - is specified. There is a further difference compared to claim 1 in that the ratio of phenol to formaldehyde is not specified.

3.3 **D1 US-A-5 670 571**

3.3.1 According to claim 1, D1 relates to a process for producing a dispersed particulate novolac resin. As disclosed at col. 4, lines 1-4 of D1 the required ratio of formaldehyde:phenol is sub-unity, i.e. in contrast

to the subject matter of operative claim 1 where the aldehyde is present in a ratio above unity relative to phenol.

3.3.2 Further claim 1 of D1 specifies that the phenol and formaldehyde are reacted under acidic conditions.

3.3.3 According to the decision under appeal, the specification in claim 1 of the third and fourth auxiliary requests of a phenol to aldehyde molar ratio of less than 1:1 conferred novelty over the teaching of D1 (see section III.(b).(iii) above). As noted above this feature is now present in claim 1 of the main request, (see section V.(b).(i) above).

This finding of the decision under appeal has not been challenged at the appeal stage, and the Board is satisfied that the conclusion reached by the opposition division is correct.

Accordingly the subject matter of claim 1 of the main request is distinguished from the disclosure of D1 by the specified molar ratio of phenol to aldehyde.

3.3.4 The novelty of the subject matter of independent claim 13 of the main request was not considered in the decision under appeal.

As explained in section 3.2 above, claim 13 is directed to a method comprising the step of reacting a phenolic component with formaldehyde in the presence of an alkaline catalyst. D1, as explained above however discloses a reaction carried out under acidic conditions.

Accordingly the subject matter of operative claim 13 is distinguished from the disclosure of D1 by the feature that an alkaline catalyst is employed.

3.3.5 The remaining claims are either dependent on claims 1 or 13 or refer back to the features thereof. Accordingly the subject matter of these claims is likewise not anticipated by the disclosure of D1.

3.3.6 Therefore the subject matter of the main request is novel over the disclosure of D1.

3.4 **D2: US-A-5 371 140.**

3.4.1 Claim 1 of D2 is directed an emulsifiable resole resin composition comprising a resole resin and an emulsifying agent. The resole resin is prepared from an aldehyde and phenol in a molar ratio of aldehyde to phenol of about 2.0:1 to about 6.0:1 in the presence of a basic catalyst.

3.4.2 Considering first the disclosure of the amount of emulsifying agent, in the general presentation of D2, the only explicit disclosure is of the preferred range of 0.1 to 5 wt. % of the total resin solids (col. 13 line 27 - see section III.(a).(ii) above).

(a) There is no disclosure in D2 - express or implied - of any other non-preferred or general range for the content of emulsifying agent. Accordingly the finding of the decision under appeal (see section III.(a).(ii) above) that the absence of an explicit disclosure of such a general (non-preferred) amounted to a disclosure of a range from above 0 wt. % to 100 wt. % is not supported by the facts.

(b) It is further taught in D2 that at an amount of emulsifying agent below 0.1 wt. % (based on total resin solids) the system loses its water

emulsifiability (col. 13 lines 27, 28). The opposition division held this teaching to imply that tests at this level of emulsifying agent had been carried out and hence belonged to the disclosure of D2 (see section III.(a).(ii) above). There is however no evidence in D2 that such tests were ever in fact carried out. Accordingly these objections is also not supported by the facts. The respondent considered this statement to amount to an explicit disclosure of resole resins containing the amount of emulsifying agent specified in the operative claims (see section VI.(a) above). However this statement, on the contrary, amounts to an explicit exclusion of such concentration ranges from the scope of D2. According the position advanced by the respondent is likewise not supported by the facts.

- 3.4.3 Regarding the alleged contradiction identified by the appellant in the disclosure of D2 with respect to the emulsifying agent (see section V.(b).(ii) above), according to column 12, lines 36 to 42 of D2 the emulsifiable compositions of D2 are prepared by addition to the resole resin of an emulsifying agent, which is preferably a proteinaceous compound. As noted in section 3.4.2 above, the preferred amount of this compound is between 0.1 and 5 wt. % **based on the total resin solids** (col. 13 line 27). According to col. 13 line 4 the content is specified as being 0.5-20 parts **per 100 parts of resole resin solids** (Board's emphasis in each case). These two ranges thus refer to different bases, namely the total resin solids and the resole resin respectively. Since the resole resin only constitutes a part of the total resin solids, it is

mathematically consistent that the content of emulsifying agent expressed as a percentage only of this component will be higher than that based on the total solids content. Accordingly there is no inconsistency or contradiction within D2 with respect to the specified contents of emulsifying agent.

3.4.4 Examples 1 and 3 of D2 disclose the preparation of resins and the emulsification thereof.

- (a) According to example 1 of D2, a resin was prepared employing a ratio of 3.5 moles of formaldehyde per mole of phenol. The solids content of the emulsion is not disclosed. To this emulsion was added a casein solution (emulsifying agent - cf column 12 line 48 of D2), containing 20 wt. % casein at an amount of 5 wt. % based on the overall composition. Accordingly it may be calculated that the amount of casein added was 1 wt. % based on the overall composition.
- (b) According to example 3 a formaldehyde/phenol resin in a ratio of 4.3:1 was prepared. The total weight of components (including water) employed can be calculated as being 3704g. The resulting solids content is neither disclosed in D2 nor has it been argued that this is derivable from the information provided in D2. To this was added 100g of a 20 % by weight casein solution, i.e. 20g casein. The amount of casein based on the entire composition can thus be calculated as being 0.5 % by weight.
- (c) The amount of casein in the binder emulsions of the cited examples of D2 is thus 0.5 % or 1 % by weight based on the total weight of the emulsions (i.e. solid and liquid components). The weight percentage of casein in relation solely to the

solid content of the binder, which is the basis specified in operative claim 1, will therefore be higher. Accordingly, although the precise content of casein in relation to the solid content of the binders of D2 is not disclosed, or derivable from the disclosure, the above analysis shows that this will necessarily and inevitably be above 0.5 % by weight and hence above the threshold of 0.1 % by weight specified in operative claim 1.

- 3.4.5 Accordingly there is no disclosure - implicit or explicit - in D2 of an emulsion with a content of emulsifying agent below 0.1 wt. % based on the solid content of the binder.
- 3.4.6 During the opposition procedure, the question arose whether application of the case law developed with respect to so-called "selection inventions" would result in a finding of lack of novelty.
- (a) This line of argument was developed based on the conclusion that D2 disclosed a non-preferred range of content of emulsifying agent from "more than 0 wt. % up to 100 wt. %" (see section III.(a).(ii) above).
- (b) As however explained in section 3.4.2.(a) above) there is in fact no disclosure of said broad, non-preferred range in D2. Consequently the question of overlapping ranges and associated considerations with respect to novelty in the case of so-called "selection inventions" set out in T 198/84 and T 26/85 respectively do not arise in this case.
- (c) With respect to the question of any residual overlap by virtue of the term "below 0.1 weight

percent" (D2, col. 13 line 28), the Board takes the view that the principles of T 26/85 would apply but in view of the clear teaching in the cited passage of D2 to avoid concentrations of protective colloid below 0.1 weight percent, would lead to the conclusion that the skilled person would not seriously consider working in any such area of overlap.

3.4.7 The subject matter of claim 1 is therefore distinguished from the disclosure of D2 by the specified content of protective colloidal agent of less than 0.1 % by weight based on the solid content of the binder. This conclusion also applies to the subject matter of independent claim 13. As the remaining claims refer back to the features of claim 1 and/or 13 this conclusion also applies to the subject matter of these claims.

3.5 It is therefore concluded that the subject matter of the claims of the main request is novel.

Inventive step

4. *The patent in suit - the technical problem, its solution*

4.1 According to paragraphs [0012]-[0015] of the patent in suit the aim of the invention was:

- To provide an aqueous phenolic binder which exhibits a low emission of low molecular weight compounds such as free phenol and free ammonia.

- To provide a phenolic resin which is stable for transportation and storage for a suitable period of time;
- To provide a binder which exhibits a high binding capacity;
- To provide an aqueous binder which can be used in the normal processes of applying binders in the production of mineral wool products and which results in a reduced need for cleaning the process equipment.

4.2 This problem is solved, according to paragraph [0016] and claim 1 of the patent in suit by a binder containing *inter alia* a protective colloidal agent in a concentration of less than 0.1 % by weight based on the solid content of the binder.

4.3 Having regard to the examples of the patent in suit, in particular the data reported in Tables 2-4 thereof the Board is satisfied that these problems have been solved by the subject matter claimed.

5. *The closest prior art*

By common consent, D2 was considered during the opposition proceedings to represent the closest prior art (Notice of Opposition, section I.1.2.1, rejoinder of the proprietor, section 4.2). This document is also acknowledged in the patent specification (paragraph [0007]). According to column 1, lines 15-19 and column 4, lines 6-16 of D2 the invention thereof is directed to the provision of emulsifiable binders for fibres and as binders in fibrous mats, i.e. the same technical field as the invention of the patent in suit.

Accordingly the Board is satisfied that D2 can be considered to represent the closest prior art.

As explained in section 3.4.7 above, the subject matter of the operative claims is distinguished from the teaching of D2 by the specified concentration of protective colloidal agent.

6. *The objective technical problem with respect to D2*

There is no evidence that the distinguishing feature gives rise to any particular technical effect compared to the binders of D2.

Accordingly the objective technical problem is to provide further or alternative binder emulsions.

7. *Obviousness of the claimed solution*

7.1 As recorded in section 3.4.2.(b) above, the closest prior art, D2, explicitly teaches that such a content of colloidal agent would not be effective, since, according to D2 this would not allow emulsifiable systems to be obtained.

There is no evidence or data in D2 that would indicate that this conclusion was not correct.

7.1.1 Thus not only is there no explicit or implicit teaching in D2 to employ a content of protective colloidal agent (emulsifying agent) in the claimed range, there is, on the contrary, an explicit statement that such a level of said compound would not allow the aims of D2 to be achieved.

Accordingly the subject matter of the independent claims is not rendered obvious by the disclosure of D2.

7.1.2 Consideration of the submission of the respondent (see section VI.(b) above) that employing a content of emulsifying agent within the range of D2, i.e. above 0.1 wt. % leads to better results, i.e. more stable emulsified systems, than amounts below 0.1 wt. % does not lead to a different conclusion. This submission is based on two sources of information, namely on the one hand D2 and on the other hand the examples of the patent in suit itself. The examples of the patent however do not form part of the prior art citable pursuant to Art. 54(2) or 56 EPC. Accordingly the submissions which rely on the evidence of the examples of the patent in suit must be disregarded. The teaching of D2 with respect to the amount of 0.1 wt. % of emulsifying agent is not one of degree but of absolutes. It is explicitly and unambiguously stated that contents of emulsifying agent below 0.1 wt. % result in a loss of water-emulsifiability, i.e. would not lead to emulsified systems of any kind (see section 3.4.2(b) above).

7.2 No different conclusion would be reached by consideration of the combination of D2 with any of the other documents cited by the opponent.

7.2.1 The patent document D1 relates to an aqueous dispersion of small particles of a novolac resin useful e.g. in a binder. In contrast thereto, the patent in suit is directed to a binder based on a resole (cf section 3.3 above with respect to D1).

7.2.2 D3 relates to a process for producing microspherical cured phenolic resin particles by a process which comprises reacting a novolac with a phenol and an

aldehyde. Thus not only does D3 not disclose resoles, it is not even directed to the provision of an aqueous dispersion suitable for use as a binder.

7.2.3 D4 is an extract from a technical encyclopaedia relating generally to the use of phenolic resins as binders for glass- and rock-wool fibres for thermal and acoustical insulation. This extract however does not make any distinction between the different classes of phenolic resins (resole and novolac). Further there is no discussion or consideration of the form or constitution of the composition (e.g. dispersion) by means of which the binder is applied to the fibres.

7.2.4 Accordingly none of D1, D3 or D4 can provide the skilled person with any guidance to the claimed solution to the objective technical problem with respect to the resole compositions of D2.

8. The subject matter of the claims of the main request is therefore founded on an inventive step.

9. *Scope of the decision*

Although the decision under appeal did not consider inventive step (Art. 56 EPC), extensive submissions were made on this opposition ground both during the written opposition proceedings. Both parties also made submissions on this aspect in the appeal proceedings. Accordingly, the Board considers it appropriate in the circumstances to exercise the power within the competence of the opposition division and consider also the matter of inventive step (Art. 111(1) EPC).

10. The appellant has made an auxiliary request for oral proceedings (see sections V and VII above). No such request has been made by the respondent. Since the Board is in a position to allow the main request of the appellant, there is accordingly no need to convene oral proceedings.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of claims 1-26 of the main request, filed with letter dated 24 March 2006, and after any necessary consequential amendment of the description.

The Registrar:

The Chairman:

E. Görgmaier

R. Young