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Datasheet for the decision of 15 May 2007

Case Number: T 0593/05 - 3.3.05

Application Number: 98106978.4

Publication Number: 0873978

IPC: C04B 28/02

Language of the proceedings: EN

Title of invention:
Poly (Vinyl Alcohol) stabilized acrylic polymer modified hydraulic cement systems

Patentee:
Wacker Polymer Systems GmbH & Co. KG

Opponent:
Celanese Emulsions GmbH

Headword:
PVOH stabilized cement/WACKER

Relevant legal provisions:
EPC Art. 100(b), 123(2), 123(3), 54, 56

Keyword:
"Sufficiency of disclosure (yes)"
"Added matter (no)"
"Extension of the protection conferred (no)"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

Case Number: T 0593/05 - 3.3.05

DECISION
of the Technical Board of Appeal 3.3.05
of 15 May 2007

Appellant: (Opponent)	Celanese Emulsions GmbH Frankfurterstr. 111 D-61476 Kronberg (DE)
Representative:	Ackermann, Joachim Postfach 11 13 26 D-60048 Frankfurt am Main (DE)
Respondent: (Patent Proprietor)	Wacker Polymer Systems GmbH & Co. KG Johannes-Hess-Strasse 24 D-84489 Burghausen (DE)
Representative:	Schuderer, Michael Wacker Chemie AG Zentralbereich Patente, Marken und Lizenzen Hanns-Seidel-Platz 4 D-81737 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted 29 March 2005 concerning maintenance of European patent No. 0873978 in amended form.**

Composition of the Board:

Chairman:	M. Eberhard
Members:	J.-M. Schwaller S. Hoffmann

Summary of Facts and Submissions

I. The appeal was lodged by the opponent against the interlocutory decision of the opposition division to maintain the European patent No. 0873978 based on the set of claims according to the main request submitted with letter of 21 January 2005.

II. During the opposition procedure, the parties relied *inter alia* upon the documents EP-A-0718314 (D1), EP-A-0538571 (D2) and EP-A-0062106 (D3)

III. In the contested decision, the opposition division held that dependent claim 10 of the main request fulfilled the requirements of Article 83 EPC. It also concluded that the subject-matter of independent claim 1 was novel over D1 and not obviously derivable from the combination of Example 3 of D1 with other parts of D1 or from the combination of D1 with D3.

IV. In the grounds of appeal, the appellant (also opponent) relied upon the new documents:

D6 = D. J. Nagy, American Laboratory, vol. 27, 4, pages 47J-47V
D7 = EP-B-0812863
D8 = US-A-4265796
D9 = US-A-4670505
D10 = GB-A-1278813

He argued that the subject-matter of claim 1 then on file was neither novel over D1, nor inventive over D1 alone or over D3 taken in combination with D1 and either of D8, D9 or D10. He also contended that the subject-matter of claim 10 then on file was insufficiently disclosed.

V. With its reply dated 09.12.05, the respondent (also proprietor of the patent) filed an amended set of claims as sole request.

VI. On 05.07.06, the appellant relied on a new document: EP-A-0723975 (D11) and held that the subject-matter of the amended claim 1 was neither novel over D1 or D11, nor involved an inventive step over D1, D3 or D11. He also reiterated the objection of insufficiency of disclosure against dependent claim 10.

VII. Following a communication of the board - pointing out that concerning the admissibility of the disclaimer *"and free of epoxide reactivity"* in claim 1, the standards set out in G 1/03 would appear to be applicable to the present case - the respondent submitted on 16.04.07 a new set of claims as the main request, in replacement of the one filed with letter of 09.12.05. In this set of claims, claim 10 previously on file has been deleted and claim 1 reads as follows:

"A mortar composition comprising a hydraulic cement and a polymeric binder, the binder comprising an acrylic polymer having a weight average particle diameter of 0.3 to 0.8 micrometers, formed by emulsion polymerization of an acrylic monomer system consisting of C_{1-8} *lower alkyl esters of acrylic or methacrylic acid, and optionally other ethylenically unsaturated monomers out of the group consisting of vinyl acetate, acrylamide, methacrylamide, acrylic and methacrylic acid, maleic and fumaric anhydride, in an amount of*

below 5% by weight of the monomers employed in producing the polymer,
in the presence of a stabilizer system consisting essentially of poly(vinyl alcohol) and containing no surfactant, and of a chain transfer agent."

VIII. During the oral proceedings, which took place on 15 May 2007, a new set of claims 1-9 was filed as the sole request. This set of claims distinguishes from the one filed on 16.04.07 in that dependent claim 5 has been deleted and in that the remaining claims and their dependencies have been renumbered.

IX. The arguments of the appellant can be summarized as follows:

- The patent in suit is objectionable under Article 100(b) EPC because it does not indicate the measurement method used for determining the molecular weight of the poly(vinyl alcohol) (hereinafter called PVOH) used in the mortar compositions depicted therein. In support of this objection, reference is made to the experimental report 2 filed with the notice of opposition, as well as to the documents D6 and D7.

- The content of D1 destroys the novelty of the subject-matter of claim 1.

- There is no evidence either in the patent in suit or in the file for the alleged improved adhesion and improved water resistance of the mortar compositions defined in claim 1 of the present request over mortars prepared with the polymeric binders of either D1, D3 or D11. In the absence of improvement over these relevant prior art documents, the problem to be solved can only be seen in the provision of another PVOH stabilized acrylic polymer modified mortar composition. In view of this problem, the subject-matter of claim 1 lacks an inventive step over each of D1, D3, D11, taken independently.

X. The respondent (patent proprietor) principally argued as follows:

- PVOH polymers having a molecular weight falling within the range defined in the patent in suit were commercially available at the priority date of the patent in suit. Furthermore, the SEC-MALLS method described in D6 is an absolute measuring method which requires no reference standards; it is the method used in the patent in suit for PVOH molecular weight determinations. There is no evidence that the partially hydrolyzed PVOH used in D6 is the same as the one used in D7.

- The features combination of claim 1 is not disclosed in D1.

- The mortar defined in claim 1 has improved adhesion properties and improved water resistance as evidenced by the tables in the patent in suit. Neither D1 nor D3 address the problem of improving water resistance of mortars and their mechanical properties, such as adhesion. D11 solves this problem differently.

XI. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent requested that the decision under appeal be set aside and that the patent be maintained on the basis of the sole request filed during the oral proceedings.

Reasons for the Decision

1. *Sufficiency of disclosure*

1.1 The appellant argued that it was apparent from paragraphs [0022] and [0023] of the patent in suit that the molecular weight of the PVOH was essential for producing a high solids (e.g. > 45% by weight) all acrylic emulsion without the use of surfactants, solubilizers and microfluidization techniques, and that the PVOH had to be selected in this case from the group consisting of substantially fully hydrolyzed PVOH and/or partially hydrolyzed PVOH, > 86%, with a molecular weight ranging from about 5,000 to 13,000. The contested patent was however silent as to how the molecular weight of PVOH has been determined therein. As can be seen from experimental report 2, simple variations of the operating conditions (temperature, calibration, eluant) of the measurement method, in particular when GPC (gel permeation chromatography) was used, greatly influenced molecular weight measurements. In consequence, since reliable measurements could only be made if details concerning the measuring method and its operating conditions were indicated in the patent in suit, and since in the latter this information was lacking, the issue of insufficiency of disclosure arose - despite the deletion of dependent claim 10 - taking into account that present claim 1 encompassed all PVOHs.

The appellant further referred to D6 and D7 and in this respect compared the data of the first partially hydrolyzed PVOH in Table 1, page 47R of D6 with those of the PVOH A-502 (A = Airvol®) in the Table of Example 5 of D7. He argued that these data showed that one and the same PVOH would according to one document (D6) have a number average molecular weight (M_n = 13,000) falling within the range defined in paragraph [0022] of the patent in suit, while according to the other document (D7), it would have an M_n value (13,900) falling outside said range. This discrepancy showed that it was essential to indicate the measuring method for the PVOH polymers since in view of D6 and D7 the skilled person was otherwise confronted with a contradiction he was not able to solve.

1.2 Concerning this last argument, the board notes that D7 was published after the priority date of the patent in suit and the skilled person could thus not have observed any discrepancy between D6 and D7 before this date. There is furthermore no evidence that the abovementioned Airvol® PVOH A-502 described in D7 as having a hydrolysis degree of 87-89%, a viscosity of 3.0-3.7 cP and a M_n of 7,000 to 13,000 is the same PVOH as the partially hydrolyzed PVOH described at page 47R of D6 as having a viscosity of 3 cP (4% solution in water, 20 °C) and a M_n of 13,900. The sole information in D6 about the PVOHs tested is that they are commercial grades of Airvol® (page 47L, 3rd column) available before February 1995, the publication date of D6.

Concerning the characterisation of the molecular weight of the PVOH in the patent in suit, the latter indeed contains no information as to which measurement method has been used. The board notes however that the size exclusion chromatography was already commonly used before the priority date of the contested patent, as indicated in D6 (page 47J, 1st column, last line to 2nd column, line 23), which describes how in recent years, PVOH has been characterized for molecular weight distribution by aqueous size exclusion chromatography (SEC) using a number of different column supports, detection schemes, and calibration methods. The results obtained with such measurement methods are nevertheless - as evidenced by appellant's experimental report 2 - strongly dependent on the operating conditions used.

According to D6 (page 47R, 2nd column, lines 28-32; page 47V, first lines of "Summary"), it was already possible before the priority date to directly measure the molecular weight of PVOH polymers, independently of elution volume and without the need for column calibration, by using the characterisation method called SEC-MALLS. D6 is however a scientific publication which cannot be regarded as part of common general knowledge before the priority date. D6 was furthermore not referred to in the patent in suit. As nevertheless argued by the respondent and not contested by the appellant, the PVOH polymers used in the patent in suit - in particular those having a number average molecular weight of from about 5,000 to 13,000 - were commercially available at its priority date. Hence, the skilled person trying to reproduce the present invention could have bought the PVOHs having the desired molecular weight and degree of hydrolysis, in particular the one used in Example 1 of the contested patent (M_n = 6,000; degree of hydrolysis of 97.7%) by a PVOH polymers supplier, for example the former applicant of the contested patent. Since the appellant, who has the burden of proof, neither contested the commercial availability of the above-mentioned PVOH nor provided any evidence that by using such a polymer it was impossible without undue burden to reproduce the acrylic emulsion and the mortar composition described in the patent in suit, it follows from the above that an insufficient disclosure within the meaning of Article 100(b) EPC cannot be established in the present case.

2. *Allowability of the amended claims under Article 123 EPC*

The appellant indicated at the oral proceedings that he had no objection under Article 123(2)(3) EPC as regards the amendments to claim 1, in particular the suppression of the disclaimer "*and free of epoxide reactivity*" which was recited in granted claim 1 and the restriction of the monomers to an exhaustive list of compounds bearing no functional epoxy group.

Concerning the suppression of the disclaimer, the appellant argued, in reply to the question from the board whether a "*stabilizer system consisting essentially of poly(vinyl alcohol)*" or a "*chain transfer agent*" might include compounds having an epoxide reactivity, that in theory, it was not inconceivable that a chain transfer agent - which generally was a mercaptan - might include an epoxide functionality. He nevertheless stated that he was not aware of any such compound. He furthermore observed that he would have doubts as to whether such an epoxide group, if present in a chain transfer agent, would withstand the operating conditions of an emulsion polymerization process.

The respondent stated that he was also not aware of any chain transfer agent bearing an epoxide group. He argued that molecules having such a functionality would immediately react and thus would in any case be unsuitable as stabilizer.

In view of the above parties' submissions, which emanate from experts in the technical field of the patent in suit, the board concludes that a skilled person would not directly and unambiguously derive from the wording of amended claim 1 that the acrylic polymer defined therein comprises "epoxide reactivity". Accordingly, it cannot be considered that the scope of protection conferred by the amended claims has been extended over that of the claims of the patent in suit (Article 123(3) EPC).

Since amended claim 1 has a basis in claim 1 and in the passages at page 6, line 20 to page 7, line 6; page 9, lines 6-10 and at page 10, lines 11-12 of the application as filed, and since dependent claims 2-9 correspond respectively to dependent claims 2, 3, 4, 6, 7, 8, 9, 12 of the application as filed, the set of claims of the present request also fulfils the requirements of Article 123(2) EPC.

3. *Novelty*

3.1 The appellant argued that the content of D1 anticipated the subject-matter of present claim 1 because:

- monomer systems falling within the wording of present claim 1 were disclosed at page 3, lines 7-10;
- PVOH was disclosed as the preferred protective colloid, among those listed at page 3, lines 11-13;
- the surfactants were optional (see page 3, lines 39-40);
- a chain transfer agent (n-dodecanethiol) was used in all the examples;
- the dispersions produced had an average particle diameter in the range of from 500 to 2500 nm (see page 4, lines 4-6) and in Example 3, the average particle diameter was specifically 640 nm;
- redispersible powders obtained by spray-drying the dispersions of D1 were suitable for use in *inter alia* hydraulically setting building materials (see page 4, lines 13-15).

3.2 The board notes that D1 (page 2, lines 29-39) discloses a process for preparing an aqueous polymeric dispersion stabilized by a protective colloid, said dispersion being based on a copolymer of (a) one or more esters of acrylic acid and/or methacrylic acid and of an alcohol containing 1 to 22 carbon atoms; and optionally, (b) further monomers which can be copolymerized with the first monomer. These dispersions are preferably used as binders in environment-friendly wood preservative paints (page 4, lines 10-12). Redispersible powders, obtained by spray-drying the dispersions of D1, can themselves be employed either in hydraulically setting building materials or in powder paints (page 4, lines 13-15).

Although D1 (page 4, lines 4-6) describes the average particle size of the above dispersion as being in the range of from 500 to 2500 nm, the preferred range (from 1000 to 2000 nm) falls outside the range defined in claim 1 of the present request. Furthermore, the sole dispersion exemplified in D1 as having an average particle size (640 nm in Example 3) which falls within the said claimed range is not used in a mortar composition, but in a white dispersion paint for painting wood.

D1 also describes as optional the presence of an emulsifier (page 3, lines 39-40). Regarding the monomer system to be used, this has to be chosen among a list of formulations (D1, page 3, lines 7-10), at least some of which fall outside the scope of protection of present claim 1.

3.3 The sole specific mortar composition depicted in D1 is the one described in Example 1 (page 5, heading "*3. Cement compatibility*"). It contains 500 parts Portland cement PZ 35, 1500 parts sand, 250 parts water and 50 parts of the powder prepared in Example 1. The latter is obtained from the dispersion formed according to the emulsion polymerisation process reported at page 4, lines 21-54 of D1 and this dispersion is described in the table at page 5 of D1 as having an average particle diameter of 1155 nm. The polymerisation process involves the use of 49.0 parts of a first polyvinyl alcohol, 39.2 parts of a second polyvinyl alcohol, 1.76 parts of sodium bicarbonate, 3.5 parts of Genapol® ZRO (a surfactant), 0.98 part of a defoamer (Agitan® 281) comprising a.o. nonionic emulsifiers, 637 parts of n-butyl acrylate, 343 parts of methyl methacrylate, 19.6 parts of acetoacetoxyethyl methacrylate, 19.6 parts of methacrylic acid, 0.92 parts of n-dodecanethiol (a chain transfer agent) and initiators.

Accordingly, the above mortar has been made using a dispersion having an average particle diameter which falls outside the range defined in present claim 1 and which dispersion contains surfactants (Genapol® ZRO and the nonionic emulsifiers from the defoamer) and acetoxyethylmethacrylate as one of the monomers, i.e. compounds banned from claim 1 of the present request.

3.4 As can be seen from the above, starting from the disclosure of D1, several selections have to be made to arrive at a mortar composition comprising simultaneously all the features of present claim 1 and, consequently, the claimed subject-matter cannot be directly and unambiguously derived from the content of D1.

3.5 The subject-matter of claim 1 is also novel over the other cited documents, in particular over D3 and D11 in the following respects:

- the use of a chain transfer agent is not described in D3;
- in D11, claim 1, the copolymer is defined as comprising about 0.1 to 50% by weight units of epoxide group containing ethylenically unsaturated comonomer and said units contain reactive epoxide

groups. In Comparative Example 2 of D11, which does not involve the use of the said epoxide group containing monomer, 50% of the monomers mixture consist of styrene. In comparison, the acrylic polymer defined in present claim 1 neither comprises epoxide reactive groups nor styrene units.

3.6 For the above reasons, claim 1 (and thus also its dependent claims 2-9) fulfils the requirements of Article 54 EPC.

4. *Inventive step*

4.1 The appellant argued that there was no evidence that mortar compositions according to present claim 1 would have improved properties over prior art mortar compositions, in particular as regards adhesion and water resistance. He held in this respect that the data of Tables 1 and 2 of the patent in suit - supposed to show an improved adhesion - could not be used for comparative purposes, since none of the commercial polymeric binders used as comparison references in these tables were representative of the binders used in the closest prior art documents D1, D3 or D11. He also argued that the experimental report 1 filed with the notice of opposition attested the absence of an alleged better water resistance.

4.2 The board observes that none of the mortars used for comparative purposes in Tables 1-3 of the patent in suit comprises a binder as described in either of the documents D1, D3 and D11. The said Tables can thus not serve to establish any kind of improvement over these prior art documents.

4.3 Tables 1-2 and paragraphs [0043] to [0047] of the patent in suit however show that the mortars presently claimed have equivalent or better adhesion (as measured by shear strength), in particular under wet conditions, over mortars prepared using a commercially available surfactant stabilized substantially all acrylic emulsion (Sample A of Table 1) or a commercial PVOH stabilized VAE (vinyl acetate-ethylene) emulsion (Sample C of Table 1), and over a mortar made with a commercial redispersible VAE powder sold under the trademark Airflex RP 225 (Sample A of Table 2).

Example 4 (paragraphs [0048] to [0052]) of the patent in suit, in particular Table 3, demonstrates the superior water resistance of mortars prepared with the PVOH stabilized all acrylic polymer product, whether in emulsion or redispersible form, over commercially available polymeric binders.

Accordingly, although an improvement in adhesion or water resistance of the mortars presently claimed over those prepared with binders according to D1, D3 or D11 cannot be acknowledged, it can be deduced from the data in Tables 1 to 3 that the claimed mortars have high adhesion properties as well as a high water resistance.

4.4 D1 as the closest prior art

4.4.1 As indicated in items 3.2 to 3.4 *supra*, the sole specific mortar composition disclosed in D1 (Example 1, heading "Cement compatibility") makes use of a dispersion with an average particle diameter (1155 nm) falling outside the range defined in present claim 1, and which dispersion contains compounds (surfactants and acetoxyethylmethacrylate as one of the monomers) explicitly excluded from said claim.

4.4.2 Starting from the specific mortar composition reported in Example 1 of D1, from which the subject-matter of present claim 1 differs by the weight average particle diameter of the acrylic polymeric binder (0.3 to 0.8 micrometers), the absence of a surfactant in the stabilizer system and the composition of the acrylic monomer system, the problem to be solved by the claimed subject-matter may be seen in the provision of a mortar composition comprising a polymeric binder in form of either an emulsion or a redispersible powder, which mortar has high adhesion properties in particular under wet conditions and a high water resistance (paragraphs [0017] and [0018] of the patent in suit).

4.4.3 In view of the data of the patent in suit, in particular the Examples, it is credible that this problem has actually been solved by the mortar composition as defined in claim 1.
(see item 4.3 above).

4.4.4 The solution as proposed in claim 1 involves an inventive step for the following reasons:

As indicated in item 3.2 *supra*, D1 discloses a process for preparing an aqueous polymeric dispersion stabilized by a protective colloid, said dispersion being preferably used as a binder in environment-friendly wood preservative paints. In the form of a redispersible powder, the dispersion can also be employed in hydraulically setting building materials or in powder paints.

D1 deals with the problem of providing a process for preparing a protective colloids stabilized dispersion easy to carry out industrially and in which the viscosity of the dispersion during polymerization lies in a range which guarantees good stirrability and pumpability (page 2, lines 26-28). This problem is different from the one underlying the subject-matter of present claim 1.

D1 furthermore teaches away from using dispersions with an average particle diameter falling within claim 1 in mortar compositions: on the one hand, it describes the average particle diameter as being preferably 1000 to 2000 nm (D1, page 4, lines 4-5) and on the other hand, the unique mortar exemplified therein employs a dispersion with an average particle diameter (1155 nm) falling outside the range presently claimed. As regards the dispersions of D1 which have an average particle diameter falling within the claimed range, these are either not used in a mortar composition (Example 3) or they are used in the dispersibility test for comparative purposes (Example 1, page 6, lines 15-53 and Table 2). In the latter case, one comparative dispersion was found to be very poorly redispersible in water and the second one led to a very tacky product which settled in the spray tower and in the pipeline (page 6, lines 35-36 and 52-53). The skilled person faced with the problem stated above would therefore neither be inclined to try such dispersions nor to decrease the average particle size of the dispersion according to Example 1 of D1. Furthermore, since in the Example of D1, it is the cement compatibility of the dispersion powder which was tested, not the adhesion and water resistance of the mortar composition, and since D1 furthermore does not deal with the adhesion and water resistance of mortars, the skilled person confronted with the problem stated above would not find in D1 any incentive to leave out the surfactants and the acetoxyethylmethacrylate monomer used in the preparation of the polymeric dispersion according to Example 1 of D1. The sole fact that D1 describes in a very general way that the dispersion **can** comprise surfactants (page 3, lines 39-40), or that some of the copolymer compositions described at page 3, lines 7-10 fall within the definition stated in present claim 1, cannot be seen as a motivation to modify the composition of Example 1 of D1 in the said way in order to solve the problem stated above.

The skilled person faced with the above problem would also not take into consideration the dispersion of D1, Example 3, because although this dispersion has an average particle diameter falling within the range claimed, it is used for the different purpose of preparing a white dispersion for painting wood and, like the dispersion used in the mortar of Example 1 of D1, it also makes use of surfactants and of acetoxyethylmethacrylate as one of the monomers, i.e. compounds which are excluded from present claim 1.

For the reasons indicated above, D1 does not suggest the subject-matter of claim 1 of this request.

4.5 D3 as the closest prior art

4.5.1 D3 (page 1, first paragraph; page 2, lines 1-9) relates to stable aqueous dispersions based on fine particles of (co)polymers of styrene and/or of acrylic and/or methacrylic acid esters which, owing to the special manufacturing process, have increased water resistance. The dispersions are stabilized, during manufacture, preferably with a polyvinyl alcohol and comprise at least 60% by weight of (meth)acrylic acid ester units and/or styrene units. They can be manufactured without using emulsifiers during the polymerization process.

They can be used as binders in dispersion dyes and most of them also in hydraulically setting building materials (page 7, lines 7-8 and 10-12). They can be atomized and spray-dried and are therefore also suitable for the manufacture of redispersible polymeric powders (page 7, lines 21-22).

The dispersions of Examples 5 and 8 of D3 have been used for comparative purposes in D1 (page 6, lines 17-54) and have been described therein (D1, Table 2) as having an average particle diameter of respectively 364 nm and 475 nm.

4.5.2 The subject-matter of claim 1 of the present request is distinguished from D3 at least in that it relates to a mortar composition whose polymeric binder is formed in the presence of a chain transfer agent during the polymerization process.

4.5.3 The problem to be solved with respect to D3 as starting point is also the one indicated in item 4.4.2 *supra*.

4.5.4 Apart from the very brief disclosure in D3 (page 7, lines 10-12) that the dispersions can be used, among others, as binders in hydraulically setting building materials, D3 does not give any further detail, let alone any Example, concerning such building materials. D3 furthermore is totally silent as to the problems of adhesion or of water resistance of a mortar composition comprising a hydraulic cement and none of the monomer systems exemplified in D3 (page 9, lines 11-13; Table 2; footnote 16 at page 14) fall within the definition of the monomer system defined in claim 1 of the present request.

The appellant indicated that the problem of water resistance was addressed in the last line of the first paragraph at page 1 of D3. The board cannot endorse this argument because the water resistance in question concerns the film formed from the dispersion, not the water resistance of a mortar prepared with such a dispersion.

Under these circumstances and in the absence of any hint in D3 as to how a mortar with high adhesion properties and high water resistance could be obtained, the skilled person faced with this problem has no clue to modify the monomer systems exemplified in D3, let alone to prepare the polymer in the presence of a chain transfer agent.

4.5.5 The appellant argued that he had doubts whether the chain transfer agent would have any effect on the adhesion properties and the water resistance of the mortar composition, but he did not provide any evidence for this allegation. He also held that the use of a chain transfer agent was known e.g. from D8, D9 or D10 and that the skilled person would, without inventive skill, apply these agents in the emulsion polymerization process described in D3. The board cannot follow this argument, because none of the documents D8 to D10 relate to mortar compositions, let alone to mortars having high adhesion properties and water resistance. Thus, the skilled person faced with the problem indicated above would not consult these documents and if he did, he would also have no reason to combine them with the content of D3.

4.5.6 The dispersions of Examples 5 and 8 of D3, reported in D1 as having an average particle diameter of respectively 364 nm and 475 nm are either poorly dispersible in water or settled in the spray tower (see point 4.4.4 above) and D1 does not suggest their use in the preparation of a mortar composition for imparting high adhesion and high water resistance to such a composition. Thus the subject-matter claimed is also not obvious from a combination of D3 with D1.

4.5.7 For the reasons indicated above, D3 also does not suggest the subject-matter of claim 1 of this request.

4.6 D11 as the closest prior art

4.6.1 D11 (claims 1 and 2) relates to a composition, redispersible in aqueous media, containing a) a copolymer based on styrene and/or at least one alkyl (meth)acrylate, the amount of styrene and/or alkyl (meth)acrylate being ⩾ 50% by weight, based on the total monomers, as well as at least one further comonomer, b) a water-soluble polymeric protective colloid in the form of polyvinyl alcohol, and c) optional further additives. The copolymer comprises about 0.1 to 50% by weight units of an epoxide group containing ethylenically unsaturated comonomer and said units contain reactive epoxide groups, wherein polymeric acrylic protective colloids which have monomer units with at least one aldehyde or ketone group are excluded. Claims 11 and 23 describe an aqueous polymer dispersion containing such a composition and its use in various applications, *inter alia* in plastic-containing, cement-bonded systems, preferably in mortars, cement paints and adhesives. Claim 12 discloses that said dispersions are prepared by polymerization in aqueous phase and dependent claim 15 that the polymerization is carried out in the presence of an emulsifier.

The use of an emulsifier is optional, as confirmed by the Examples, which make use of such a compound only in Examples 4, 5 and 6. The average particle size of the solids in the exemplified dispersions falls either within the range defined in claim 1 of the present request (Examples 1, 2 (comparative), 3, 5 and 8) or outside said range (Examples 4, 6 and 7).

Regarding the use of a chain transfer agent, none of the examples make use of such an agent. D11 (page 6, lines 29-36) only states that it may be advantageous to use water-soluble viscosity control agents acting as radical transfer agents during the grafting of the monomers on the polyvinyl alcohol. Suitable viscosity control agents are low-molecular organic sulfur compounds, such as e.g. thioglycolic acid, low-molecular non-surface-active amino alcohol compounds, such as e.g. triethanolamine, aldehydes or halogenated hydrocarbons having 1 to 8 carbon atoms; triethanolamine being the preferred one.

Mortar compositions are only described in Example 9. These are prepared from the dispersions 1 and 2, respectively from Examples 1 and 2 (dispersion 2 bears no epoxide groups and is used for comparative purposes). The adhesion of the mortars was tested and the mortar system containing the dispersion powder bearing epoxide groups (dispersion 1) was found as having an increased adhesive strength on tiles (see also Table 1 on page 9).

4.6.2 The subject-matter of present claim 1 distinguishes from Example 9 of D11 in the alternative containing the comparative dispersion of Example 2, in that it does not comprise a styrene monomer and in that the polymerisation was carried out in the presence of a chain transfer agent.

The subject-matter of present claim 1 distinguishes from D11 at least in that the acrylic polymer defined in claim 1 does not comprise epoxide reactive groups.

It is furthermore observed that all the monomer mixtures used in the Examples of D11 contain substantial quantities (from 47.5% to 50% wt.) of styrene, which monomer falls outside the definition in present claim 1.

4.6.3 As indicated in D11 (page 7, lines 17-21), in case of use of the polymeric binder of D11 in tile adhesive formulations, both the adhesion of the tile and the cohesion of the mortar are greatly improved. Furthermore, occurring crosslinking reactions lead to an outspoken improvement wherever high water proofness is to be obtained. Thus, in D11, the problem of providing a mortar with high adhesion and high water resistance appears to have been already solved.

4.6.4 The problem to be solved by the subject-matter of present claim 1 may thus be seen in the provision of another mortar composition comprising a polymeric binder and also having high adhesion properties and high water resistance.

4.6.5 According to the paragraph bridging pages 6 and 7 of D11, the desired improved properties of the system are based upon a reaction of the epoxide groups with suitable reactants or of the epoxide groups with themselves. In hydraulic binders, a reaction of the epoxide groups may take place with free hydroxy groups of the silicate constituents contained therein. Contrary to the subject-matter of claim 1 of this request - wherein the acrylic polymer does not comprise any epoxide reactive groups - D11 thus explicitly requires as an essential feature of the invention disclosed therein that the copolymer comprises about 0.1 to 50% by weight units of an epoxide group containing ethylenically unsaturated comonomer and that said units contain reactive epoxide groups in order to achieve the desired properties.

Thus, the skilled person faced with the problem of providing another mortar composition also having high adhesion properties and high water resistance would be deterred in view of the teaching of D11 to leave out the essential feature of the invention disclosed therein, i.e. that the monomer units must contain reactive epoxide groups.

The appellant stated that in view of the results in Table 1 of D11, which show that a mortar prepared with a polymeric dispersion powder containing no reactive epoxide groups - namely dispersion powder 2 - would still have high adhesive pull strength, the skilled person would have an incentive to leave out monomer units containing epoxide groups. This argument cannot be endorsed by the board, because this specific mortar was used for comparative purposes in D11 and is shown to have an adhesive strength which is substantially lower than that of the composition including dispersion 1 (according to the invention of D11). Furthermore, dispersion powder 2 is based on the dispersion prepared according to Example 2 (comparative Example), which contains 50% of styrene as a monomer (i.e. a monomer excluded from present claim 1) and which has been prepared without the presence of any chain transfer agent, which feature is also essential in present claim 1. Since D11 contains no information suggesting that a dispersion prepared without such a high content of styrene and without a comonomer containing epoxide groups but using a chain transfer agent would provide a mortar having a high adhesion and a high water resistance, its teaching cannot render the claimed subject-matter obvious and it would thus appear that the appellant's arguments were based on an analysis of the case with hindsight.

4.7 The remaining documents cited during the opposition and appeal proceedings do not contain further information which would point towards the claimed solution of the problem stated above.

4.8 It follows from the above that the subject-matter of claim 1 cannot be considered as being obvious to a person skilled in the art in view of the cited prior art. The claims 2-9 being dependent on claim 1, these claims therefore also meet the requirements of Article 56 EPC.

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 the set of claims according to the sole request filed during the oral proceedings and a description to be adapted.

The Registrar:	The Chairman:
C. Vodz	M. Eberhard