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D E C I S I O N  
of 29 October 1998

Case Number: T 0346/96 - 3.3.3

Application Number: 86630175.7

Publication Number: 0226527

IPC: C08F 246/00

Language of the proceedings: EN

Title of invention:  
Self-emulsifiable resin power

Patentee:  
The Goodyear Tire & Rubber Company

Opponent:  
Clariant GmbH Patente, Marken, Lizenzen

Headword:  
-

Relevant legal provisions:  
EPC Art. 54, 56, 69, 114(1)

Keyword:  
"Late filed document - admitted - not contested by the Respondent"  
"Scope of claim - interpretation compatible with the various embodiments"  
"Novelty - yes - interpretation of a document incorporating by reference subject-matter from another document"  
"Inventive step - yes - unobvious combination"

Decisions cited:  
-

Catchword:  
-



Case Number: T 0346/96 - 3.3.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.3  
of 29 October 1998

**Appellant:**  
(Opponent) Clariant GmbH  
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**Respondent:**  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 16 February 1996  
rejecting the opposition filed against European  
patent No. 0 226 527 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** C. Gérardin  
**Members:** P. Kitzmantel  
J. A. Stephens-Ofner

## Summary of Facts and Submissions

I. European patent application No. 86 630 175.7 in the name of The Goodyear Tire & Rubber Company which had been filed on 24 November 1986, claiming priority from a US application filed on 25 November 1985, resulted in the grant of European patent No. 0 226 527 on 30 January 1991 on the basis of 8 claims, independent Claims 1, 2, 3 and 4 reading as follows:

"1. A self-emulsifiable resin powder composition characterized by containing:

(a) a terpolymer comprised of repeat units derived from (1) about 0.1 to 6 weight percent acrylic acid, (2) about 0.1 to 4 weight percent methacrylic acid, and (3) about 93 to 99 weight percent

copolymerizable monomers, with the proviso that the total amount of repeat units derived from acrylic acid, methacrylic acid, and other carboxyl group containing monomers in said terpolymer does not exceed 7 weight percent, said weight percentages being based upon the total weight of said terpolymer; and

(b) from 0.005 to 1 weight percent, based upon the total weight of said powder composition of at least one member selected from the group consisting of metal salts of alkyl sulfonates and metal salts of alkyl sulfates."

"2. A process for making a self-emulsifiable resin powder composition characterized by:

(a) polymerizing from about 0.1 to 6 phm acrylic acid, from about 0.1 to 4 phm methacrylic acid, and from about 93 to 99 phm copolymerizable monomers in an aqueous medium in the presence of from about 0.005 to 1 phm of at least one member selected from

the group consisting of metal salts of alkyl sulfates and metal salts of alkyl sulfonates, to form a terpolymer emulsion with the proviso that no more than a total of 7 phm of acrylic acid, methacrylic acid, and other carboxyl group containing monomers is polymerized into the terpolymer; and

(b) drying said terpolymer emulsion to form a self-emulsifiable resin powder composition."

"3. A process for dispersing a self-emulsifiable resin powder composition in water characterized by:

(a) adjusting the pH of said water to greater than 7;

(b) mixing said self-emulsifiable resin powder composition into the water to form a redispersed latex wherein said self-emulsifiable resin powder composition is comprised of (1) a terpolymer comprised of repeat units derived from about 0.1 to 6 weight percent acrylic acid, (2) about 0.1 to 4 weight percent methacrylic acid, and (3) about 93 to 99 weight percent copolymerizable monomers, with the proviso that the total amount of repeat units derived from acrylic acid, methacrylic acid, and other carboxyl group containing monomers in said terpolymer does not exceed 7 weight percent, said percentages being based upon the total weight of said terpolymer; and

(c) from 0.005 to 1 weight percent, based upon the total weight of said powder composition, of at least one member selected from the group consisting of metal salts of alkyl sulfates and metal salts of alkyl sulfonates."

"4. A surface coating composition characterized by containing:

- (a) water;
- (b) a terpolymer resin comprised of repeat units derived from (1) about 0.1 to 6 weight percent acrylic acid, (2) about 0.1 to 4 weight percent methacrylic acid, and (3) about 93 to 99 weight percent copolymerizable monomers, with the proviso that the total amount of repeat units derived from acrylic acid, methacrylic acid, and the other carboxyl group containing monomers in said terpolymer does not exceed 7 weight percent, said weight percentages being based upon the total weight of said terpolymer;
- (c) from 0.005 to 1 weight percent of at least one member selected from the group consisting of metal salts of alkyl sulfates and metal salts of alkyl sulfonates, based upon the total weight of said salt and said terpolymer;
- (d) a coalescing agent; and
- (e) a plasticizer."

Claim 5 relates to a preferred embodiment of Claim 4, Claims 6 to 8 relate to preferred embodiments of Claim 1.

II. Notice of Opposition was filed by Hoechst AG on 28 October 1991 requesting revocation of the patent in its entirety, on the grounds of Article 100(a) EPC that the claimed subject-matter lacked novelty and/or inventive step over documents

D1: DE-A-2 312 408,

D2: DE-A-2 165 468,

D3: US-A-3 325 425,

D3a: US-A-2 795 564, and

D4: DE-A-2 801 099.

(Documents 3a and 4 had been submitted outside the opposition period)

An objection under the ground of Article 100(b) EPC was also raised, but only substantiated in a submission filed shortly before oral proceedings.

III. By its decision orally announced on 23 January 1996 and issued in writing on 16 February 1996 the Opposition Division rejected the opposition.

It was first held in this decision that the Opponent's objection under Article 100(b) EPC was not well founded. Further the subject-matter of the granted Claim 1 was novel over the combined disclosure of documents D3 and D3a, because that disclosure did not comprise resin compositions containing the specified anionic emulsifiers as well as terpolymers having units from methacrylic and acrylic acid.

Likewise, the subject-matter of Claims 4 and 5 was held to be novel over D4, because this document failed to disclose resin compositions which were redispersible and which contained the required low amounts of emulsifier.

Since none of the citations was concerned with the existing technical problem, the claimed subject-matter was also found to be inventive.

IV. Notice of Appeal against the above decision, with simultaneous paying of the appeal fee, was filed by the Opponent (Appellant) on 18 April 1996. The Statement of Grounds of Appeal was submitted on 24 June 1996.

Further arguments of the Appellant were submitted in a letter dated 31 January 1997 and at the oral proceedings on 29 October 1998.

With effect of 1 January 1997, together with the respective business activities, the present opposition was assigned to "Virteon Spezialchemicalien GmbH", which company's name was thereafter changed to "Clariant GmbH".

V. The Respondent (Patentee) submitted counterarguments in his letters of 7 November 1996 and 27 February 1997 as well as at the oral proceedings.

VI. The arguments presented by the Appellant, which no longer made reference to the objection under Article 100(b) EPC, may be summarized as follows:

(i) The several misinterpretations of Claims 4 and 5 as granted as well as of document D3 amounted to a procedural violation justifying the reimbursement of the appeal fee. In the oral proceedings this issue was explicitly abandoned.

(ii) The subject-matter of Claim 1 was anticipated by document D3, including the information of document D3a incorporated therein by reference, and that of Claim 4 was anticipated by, respectively, D3a, D4, and the newly cited document

D5: DE-B-2 535 72.

Each of these citations disclosed in combination all the features of, respectively, Claims 1 and 4. With respect to the latter claim it had to be taken into account that, contrary to the opinion of the Opposition Division (cf. decision under appeal, paragraph preceding the Section "Inventive step"), redispersibility was not an implicit property of the terpolymer resin (b).

- (iii) Alternatively, the subject-matter of Claim 1 was not inventive over, respectively, D2 and D3, because the use of lower amounts of hydrophilic monomer was as obvious as the use of sulfonate emulsifiers and terpolymers comprising acrylic and methacrylic acid units. The same conclusion was arrived at for the terpolymer dispersions according to Claim 4, because the reduction of the amount of emulsifiers used according to D5 and the use of appropriate amounts of additives was within the bounds of routine experimentation.

VII. The arguments of the Respondent may be summarized as follows:

- (i) The subject-matter of all claims was novel over D3/D3a, because the combined disclosure of these documents, even in its most generous interpretation, did not comprise terpolymers having both acrylic and methacrylic acid units, which had been prepared in the presence of the low amounts of the anionic emulsifiers



specified in the patent in suit. The same was also true for D4 and D5, which did not, therefore, anticipate the subject-matter of Claim 4.

- (ii) Claim 1 was also inventive over documents D3/D3a as well as over D2, because D3 was concerned with the different object of an improved spray drying process, D3a focussed on the use of larger amounts of non-ionic emulsifiers, and D2 used much too high amounts of hydrophilic monomers and was not concerned with paint formulations. Finally, the subject-matter of Claim 4 was also not obvious over D5, because that document was concerned with the different problem of wet adhesion and also used higher amounts of emulsifiers.

VIII. The Appellant requested that the decision under appeal be set aside and the European patent No. 0 226 527 be revoked in its entirety.

The Respondent requested that the appeal be dismissed.

## Reasons for the Decision

1. The appeal is admissible.
2. *Late filed document*

Document D5 was submitted with the Statement of Grounds of Appeal. At the oral proceedings the Appellant argued that the late filing of this document was triggered by the unexpected finding in the appealed decision that redispersibility was a property that was implicit to the terpolymer resin of Claim 4.

Since the Respondent, in his submission of 7 November 1996, though complaining about the filing of yet another document outside the opposition period, de facto accepted its admission by entering into lengthy discussions of its merits, both, with respect to novelty and inventive step (points 1.3 and 2.2 of this submission), the Board sees no reason to exclude this document from the proceedings (Article 114(1) EPC).

3. *Novelty*
  - 3.1 Claim 1
    - 3.1.1 Interpretation of the term "terpolymer"

Component (a) of Claim 1 refers to a "terpolymer", i.e. to a copolymer which - according to the literal meaning of this term - comprises repeat units from exactly three different monomers. However, this interpretation is inconsistent with the use of the plural-mode in Claim 1 for the (third) monomer component (3) ("copolymerizable monomers"), thus

implying the possible use of more than one group (3) monomer and is also inconsistent with the possible presence, in addition to acrylic and methacrylic acid, of "other carboxyl group containing monomers". Furthermore, Claim 8, defines a "terpolymer" having, apart from units from acrylic and methacrylic acid, 43 to 89% by weight of units from vinylaromatic monomers and 10 to 50% by weight of units from alkyl acrylate monomers. The broader meaning of the term "terpolymer" is also confirmed by column 3, lines 15 to 19 of the description, where it is stated that the "terpolymers" contain repeat units from "acrylic acid monomers, methacrylic acid monomers, and one or more copolymerizable monomers", and by Example 1, which describes the preparation of a "terpolymer" from styrene, butylacrylate, acrylic acid and methacrylic acid, i.e. from four comonomers.

Thus the claims themselves suggest and the description confirms that the prefix "ter" in the present case is not used in its literal meaning, but is, wrongly, meant to encompass the use of three or more comonomers.

Therefore, in appropriate application of Article 69 EPC, the Board decides that the term "terpolymer" used in the patent in suit is not limited to copolymers prepared from three comonomers, but embraces copolymers having repeat units from more than three monomers.

### 3.1.2 Document D3

This document relates to a method for converting an aqueous coating composition by spray drying into a redispersible dry powder, comprising (a) about 20 to 80% by weight of a film-forming resin binder being an interpolymer of about 66% by weight ethyl

acrylate, about 33% by weight methyl methacrylate and about 1% by weight methacrylic acid, (b) about 80 to 20% by weight of pigments and extenders, (c) about 0,5 to 5% by weight of a thickener and (d) about 0.5 to 1% by weight of a dispersing agent (Claim 1).

According to column 5, lines 45 to 49 the interpolymers which can be submitted to the claimed spray drying process "are amply described in U.S.P. 2,795,564 [D3a in this proceedings] which is hereby incorporated by reference." According to the Examples 1 to 3 (columns 3 and 4) resin binders made according to Examples 1 and 10 of D3a have been used.

### 3.1.3 Document D3a

This document relates to a freeze-tolerant, film-forming composition comprising an aqueous dispersion of an interpolymer having a pH between 8 and 10, the interpolymer being made up of (A) 0.5-2.5% of units from an  $\alpha, \beta$ -unsaturated vinylidene carboxylic acid, (B) units from at least one polymerizable ester forming by itself a soft polymer, and (C) units from at least one polymerizable monovinylidene compound forming by itself a hard polymer, the ratio of units A:B being between 9:1 to 1:20 (Claim 1).

In order to emulsify the monomers and to maintain the formed interpolymers in stable suspension non-ionic surface active agents are needed in amounts between 2% and 12% of the weight of the monomer mixture (column 5, line 28 to column 6, line 5).

According to Example 5 (in conjunction with Example 4) an interpolymer is prepared from 260 parts of ethylacrylate, 155 parts of methyl methacrylate, 2.5 parts of acrylic acid and 4 parts of methacrylic acid in the presence of 25 parts (i.e. 5,6% by weight based on the combined weight of these ingredients) of octylphenoxypolyethoxyethanol as non-ionic emulsifying agent.

3.1.4 Combined disclosure of documents D3 and D3a

- (i) The scope of Claim 1 of D3 is restricted to the use of a very particular resin binder comprising about 1% of methacrylic acid units and not comprising any acrylic acid units. Insofar any combination with the disclosure of D3a can only extend to such interpolymers whose carboxylic acid units are solely derived from methacrylic acid. This interpretation is in line with the fact that the dispersions according to Examples 1 and 10 of D3a employed in Examples 1, 2 and 3 of D3 do not comprise acrylic acid units (cf. D3: column 3, lines 39 to 41; column 4, lines 32 to 34 and 72 to 73; D3a: column 7, line 55 to column 8, line 21; column 10, line 55 to column 11, line 5).
- (ii) Since Claim 1 of the patent in suit requires the concomitant presence in the terpolymer of units from methacrylic acid and acrylic acid, the combined disclosure of documents D3 and D3a does not anticipate the subject-matter of this claim.
- (iii) This conclusion remains valid even if, on the basis of some parts of the description, one disregards the restriction imposed on the scope of document D3 by its Claim 1. Such a

broader interpretation of D3 may rely i.a. on the statement in column 1, lines 61 to 68: "... all types of resin binders normally employed for the preparation of liquid aqueous dispersion paints may be used ..." and on the afore-mentioned incorporation of D3a by reference in column 5, lines 45 to 49.

- (iv) In following this approach, the Appellant argued that D3 encompassed the preparation of dry powders from the polymer dispersion of Example 5 of D3a, which - with respect to its monomer composition - met all the requirements of present Claim 1.
- (v) But even in that event the disclosure of D3 would not be novelty destroying for Claim 1, which requires the presence of 0.005 to 1% by weight of specific anionic emulsifiers, because Example 5 of D3a specifies the presence of 25 parts, i.e. 5,6%, of a non-ionic emulsifier. The incorporation of Example 5 of D3a into the disclosure of D3, thus, would still differ from the subject-matter of present Claim 1 by the use of higher amounts of a different emulsifier.
- (vi) The Appellant's contention that this different amount and kind of emulsifier was not distinguishing, because document D3
  - (1) required the use only of the interpolymer resins of D3a, which are devoid of any emulsifier,
  - (2) also encompassed the use of anionic dispersing agents in

(3) amounts of only 0.5 to 1% by weight is at variance with the facts:

**ad (1):** All three examples (1, 2 and 3) of D3 specify the use of an aqueous binder **dispersion** (i.e. comprising the emulsifier) made according to, respectively, Examples 1 and 10 of D3a; since D3a explicitly requires the use of non-ionic emulsifiers, these must be present in those dispersions.

**ad (2):** The Appellant emphasized the requirement in Claim 1 of D3 of the presence of a dispersing agent (d), which according to column 6, line 69 to column 7, line 9 could be anionic, and inferred therefrom that the replacement of the non-ionic emulsifiers used according to D3a by such anionic dispersion agents would be within the disclosure of D3; however, such a conclusion is not in agreement with the statement in column 6, lines 69 to 73 of D3 that the dispersing agents are to be compatible with the resin binder, i.e. are **added to the binder dispersion** in order to help dispersing the pigments incorporated into the paint dispersion; this is confirmed by the presence of such dispersing agents in the pigment slurries used according to Examples 1, 2 and 3 of D3 (column 3, lines 24 to 30; column 4, lines 35 to 41 and 61 to 67).

Moreover, D3 does not disclose as dispersing agents any metal salts of **alkyl** sulf(on)ates: the anionic dispersing agents e.g. surfactants and dispersing agents exemplified either comprise **aryl** groups (Examples 1 and 2: sodium salt of polycarboxylated condensed **naphthalene** (Tamol 731<sup>(R)</sup>, not even being a sulf(on)ate);

Example 2: alkyl aryl sodium sulfonate;  
Example 3: formaldehyde-condensed sodium naphthalene sulfonate), or they comprise other non-alkyl radicals (column 7, lines 1 to 3: dioctylester of sodium sulfosuccinic acid).

ad (3): Claim 1 of D3 requires the presence of about 0.5 to 1.0% by weight of a dispersing agent in a dry solids composition comprising about 20 to 80% by weight of the interpolymer; it follows that, in the event of the solids containing only 20% by weight interpolymer, the amount of dispersing agent may be as high as 4.76% by weight based on the weight of the interpolymer and the dispersing agent, whereas the emulsifiers according to Claim 1 of the patent in suit are present in amounts from 0.005 to 1% by weight; moreover, the total amount of emulsifiers (dispersion agents) employed in Examples 1, 2 and 3 of D3, namely 9.1%, 6.9% and 2.8%, is also considerably above said upper limit of 1% by weight.

(vii) Thus, the subject-matter of Claim 1 is not anticipated by D3; even by the most generous cooption of the relevant parts of D3a the resulting combined disclosure does not comprise all features required by Claim 1 of the patent in suit.

3.1.5 The other two citations D1 and D2 (cf. points 4.1.3.1.1 and 4.1.1.1 below), which are relevant to the powder compositions according to present Claim 1, do not disclose resin compositions comprising both acrylic acid and methacrylic acid units. The subject-matter of this claim is, thus, novel also over this cited prior art.



3.1.6 Since the independent Claims 2 and 3 are based on the same combination of compositional features regarding the definition of the terpolymer and emulsifier as Claim 1, the same novelty considerations also apply to these claims, and, as a corollary, to Claims 6 to 8, which are directly or indirectly dependent on Claim 1.

3.2 Claim 4

It was emphasized by the Appellant, that, contrary to the appealed decision (cf point VI(ii) supra), the surface coating compositions according to Claim 4 need not comprise a polymer dispersion that was reconstituted from a resin powder as specified in Claim 1. This conclusion was not contested by the Respondent and is fully in line with the statement in column 6, lines 41 to 45 of the description that "It is, of course, also possible to use the latices of the present invention in such applications **without first drying them into a powder form** followed by reconstituting them to latex form by adding water" (emphasis by the Board).

Consequently, the Board cannot but adopt this interpretation of the scope of Claim 4.

3.2.1 Document D3a

As set out in point 3.1.3 supra, the dispersions according to D3a do not comprise an anionic emulsifier. In column 15, lines 30 to 32 the essential character of these emulsifiers is even stressed by stating: "The non-ionic emulsifiers play an important role in contributing to the stability of the copolymer dispersions and pigmented compositions prepared therefrom."

Thus, at least with respect to this feature the disclosure of D3a is distinguished from that of present Claim 4.

As set out above in detail (point 3.1.4(vi) supra) even the broadest interpretation of D3 in the light of document D3a would not lead to subject-matter comprising feature (c) of present Claim 4 (i.e. the feature concerning the amount and kind of emulsifier).

3.2.2 Document D4

3.2.2.1 This document relates to aqueous dispersions of copolymers, which may be dissolved by the addition of an alkaline agent and which comprise

- (a) 0,75 to 5,75% by weight of acid monomers including acrylic acid and methacrylic acid,
- (b) 50 to 99,25% by weight of at least one monomer selected from (meth)acrylic acid esters and vinyl esters of carboxylic or inorganic acids,
- (c) 0 to 49,25% by weight of at least one ethylenically unsaturated monomer forming a water insoluble homopolymer,
- (d) 0 to 5% by weight of one or more unsaturated monomer(s) having at least one polar group (cf. Claim 1).

According to Example 3 (cf. page 25, lines 4 to 13) a copolymer dispersion is produced in the presence of 12 parts of a sodium alkyl sulfonate emulsifier (cf. Example 2: page 23, lines 5 to 6 from the bottom in conjunction with Example 1: page 20, lines 1 to 5 from the bottom) from a monomer mixture

comprising 4 parts of acrylic acid, 12 parts of methacrylic acid, 244 parts of ethyl acrylate and 50 parts styrene. Accordingly, the amount of emulsifier is 3,73% by weight based on the combined weight of the monomers and the emulsifier.

3.2.2.2 Since the amount of emulsifier used according to Example 3 of D4 is above the upper limit of 1% by weight required by Claim 4 and since this document is devoid of any further disclosure relevant to the use of emulsifiers, the subject-matter of present Claim 4 is novel over document D4.

3.2.3 Document D5

3.2.3.1 This document relates to a process for the preparation of aqueous plastic dispersions, suitable for the production of paints having high wet adhesion, by copolymerization of

(A) 20 to 80% by weight of a rigid-phase monomer selected from methyl methacrylate, styrene and/or vinyl toluol,

(B) 20 to 80% by weight of soft-phase monomers selected from the group of acrylic acid esters derived from alcohols having 2 to 8 carbon atoms,

(C) 0,1 to 5% by weight of acrylic acid, methacrylic acid, acrylamide and/or methacrylamide, and

(D) 0,5 to 10% by weight of certain acetoacetates (cf. Claim 1).

According to column 3, lines 55 to 60 the amounts of emulsifier in the dispersions should not essentially exceed those conventionally used ("üblicherweise verwendet"), i.e. up to 3%, preferably up to 2% of ionic emulsifiers, or up to 6% of non-ionic emulsifiers.

In column 4, first paragraph ionic emulsifiers are mentioned, among which metal salts of alkyl sulfates and sulfonates.

Examples 1 to 6 (but for the absence of an acetoacetate comonomer Examples 2, 4 and 6 fully correspond to the "inventive" Examples 1, 3 and 5) disclose copolymer dispersions prepared from monomer mixtures comprising both methacrylic acid and acrylic acid in amounts satisfying the respective requirements of present Claim 4. However, the kind and amounts of emulsifiers used are different from the requirements of this claim:

|                            | Example 1*) | Example 3*) | Example 5*) | present Claim 4        |
|----------------------------|-------------|-------------|-------------|------------------------|
| methacrylic acid [parts/%] | 12p/1.9%    | 12p/1.89%   | 12p/1.85%   | 0.1 to 6% by weight    |
| acrylic acid [parts/%]     | 6p/0.95%    | 6p/0.94%    | 6p/0.93%    | 0.1 to 6% by weight    |
| emulsifier* [parts/%]      | 9p/1.4%     | 12p/1.85%   | 9p/1.36%    | 0.005 to 1 % by weight |

\* the emulsifiers used are: sodium lauryldiglycolether sulfate (Examples 1, 2), ammonium tri-tert-butylphenol polyglycolether sulfate (Examples 3 to 6); i.e. these are not alkyl sulfates

\*) the weight percentage values for the corresponding Comparative Examples 2, 4 and 6 are essentially identical

3.2.3.2 In view of the fact that the amounts exemplified in D5 for non-ionic emulsifiers are above the upper limit of 1% by weight required by present Claim 4, this document does not anticipate the subject-matter of this claim.

3.2.4 The novelty conclusions drawn with respect to Claim 4 are equally valid for Claim 5, which relates to a preferred embodiment of the subject-matter of the former claim.

4. *Inventive step*

4.1 Claim 1

4.1.1 Closest prior art

4.1.1.1 Document D2

This document represents the closest prior art, because, as the invention, it relates to self-emulsifiable resin powders compositions, designed for the preparation of aqueous dispersions to be used as surface coatings, here floor polishing agents (page 1, first paragraph; page 2 penultimate paragraph).

According to Claim 1 of D2 the resin powder compositions are prepared by copolymerising

(a) 0 to 84% by weight of monomers, whose homopolymers have a glass transition temperature from 50 to 150°C,

- (b) 5 to 88% by weight of monomers, whose homopolymers have a glass transition temperature from -100 to 50°C,
- (c) 10 to 50% by weight of strongly hydrophilic monomers of the formula  $HRC=CR'-COR''$ , where R = H, C<sub>1</sub>-C<sub>3</sub> alkyl or a carboxylic ester; R' = H or methyl; and R'' = OH which can be replaced up to 90% by amino, mono- or dialkylamino, hydroxyalkyloxy, hydroxyalkylamino or urea,
- (d) 0.1 to 5% by weight of certain chain transfer agents,
- (e) 0.1 to 5% by weight of a protective colloid, and
- (f) 0.01 to 1% by weight of an anionic emulsifier selected from alkyl, alkylpolyethoxy or aralkylpolyethoxy sulfates, sulfonates or phosphates.

According to Example 1 a resin powder is prepared from 290g methyl methacrylate, 75g ethyl acrylate, 75g butyl acrylate and 65g methacrylic acid ( $\approx 12.8\%$  by weight) in the presence of 1.90g sodium laurylsulfate ( $\approx 0.37\%$  by weight). While acrylic acid is also disclosed among the suitable hydrophilic monomers c), there is no suggestion that acrylic acid and methacrylic acid may be used conjointly (cf. page 5, lines 16 to 31).

#### 4.1.1.2 Document D3

It was argued by the Appellant that this document was the closest prior art for the assessment of an inventive step of the subject-matter of Claim 1, because, in conjunction with Example 5 of D3a

(cf. 3.1.4 supra), it was different from the present invention only with respect to the kind and amount of emulsifier. However, in the Board's judgment, D3, although dealing with self-emulsifiable powder compositions, focuses on such compositions which not only comprise binder resin, but all other ingredients necessary to formulate a paint, i.e. pigments, plasticizers, coalescing agents, etc. (cf. Claim 1; column 1, lines 11 to 17; column 1, line 61 to column 2, line 14; Examples 1, 2, 3). It is with respect to such entire paint formulations, that the problem of particle agglomeration is discussed (cf. column 1, lines 40 to 45), a problem not existing for the powder compositions according to present Claim 1, which do not contain the aforementioned "other" ingredients. This situation is not affected by the fact that, according to the open structure of the definition of Claim 1, such ingredients may be present. -

Thus, since Claim 1 of the patent in suit is not directed to self-emulsifiable resin paint compositions but to the respective binder resin compositions, the teaching of D3 concerning the prevention of agglomeration of fully formulated paint particles is not relevant to its subject-matter.

4.1.1.3 It follows that D2 clearly represents the closest state of the art.

4.1.2 Problem and solution

4.1.2.1 Starting from document D2 and in line with the shortcomings observed in the prior art, the problem underlying the subject-matter of present Claim 1 was the provision of further self-emulsifiable resin powder compositions, that on reconstitution would

provide stable aqueous dispersions which render surface coatings of improved performance (cf. column 1, lines 38 to 41). Although the latter term is not further explained in the cited passage of the description, one skilled in the art is aware from the reference therein to a high acid content that "bad" performance in this context means "bad" water resistance. This is confirmed by D3a, column 1, lines 42 to 44 ("... not so many [carboxylate] groups .. as to impart sensitivity to water ...") and D4, page 8 (hand-written), lines 6 to 15 ("The prints obtained with these binding agents [from copolymers having 7 to 20% acrylic or methacrylic acid] only exhibit a low water resistance").

- 4.1.2.2 According to the patent in suit the solution to this problem resides in the **conjoint** presence of low amounts of acid units **and** low amounts of specific anionic emulsifiers, as specified in Claim 1.
- 4.1.2.3 While it was argued by the Respondent that another important element of the problem solution would lie in the use of copolymers having repeating units from both acrylic acid **and** methacrylic acid, there is no evidence available, either in the description or elsewhere, that this feature has any particular importance for the provision of stable aqueous dispersions, rendering coatings having improved water resistance. For the purpose of assessing inventive step, this feature is therefore disregarded.
- 4.1.2.4 Example 1 of the patent in suit demonstrates that the claimed powder compositions provide stable latices. In consequence of their low content of acid units and emulsifier, coatings prepared on the basis of these powder compositions are bound to exhibit an



improved water resistance over coatings having been prepared on the basis of the binder compositions according to D2, which contain much higher amounts of acid units (there "hydrophilic monomers").

Thus, the Board is satisfied that the existing technical problem has effectively been solved by the subject-matter of Claim 1.

#### 4.1.3 Obviousness

This issue turns on the question whether the prior art contains any suggestion towards the solution of the existing problem by the conjoint use of low amounts of acids and low amounts of certain emulsifiers.

The only other documents dealing with the preparation of self-emulsifiable resin powder compositions are D1 and D3.

##### 4.1.3.1 Document D1

This document (cf. Claims 1, 13; page 6, second full paragraph) relates to dried latex powder compositions comprising a copolymer prepared from (i) about 1 to about 10%  $\alpha, \beta$ -unsaturated carboxylic acid, e.g. acrylic acid, methacrylic acid, (ii) a polymerizable monomer mixture and (iii) a 6-membered carbocyclic compound having two vicinal carboxylic substituents, e.g. phthalic acid.

According to page 9, lines 6 to 14 and page 10, lines 5 to 8 emulsifiers, preferably anionic ones, e.g. sodium laurylsulfate (cf. Examples 1 to 13), may be used at the polymerization in amounts of between 0.05 to 5% by weight.

No suggestion can be derived by the skilled person from this disclosure, that the conjoint use of low amounts of acid units and low amounts of emulsifier, both as specified in present Claim 1, would lead to resin compositions providing stable aqueous dispersions and good water resistance. Rather document D1 concentrates on the use of an additional strongly acidic comonomer (e.g. phthalic acid), thus pointing in the contrary direction.

4.1.3.2 *Document D3*

As set out in point 3.1.4 supra, the disclosure of this document, including the information incorporated by reference from D3a, only encompasses self-emulsifiable resin powder compositions comprising non-ionic emulsifiers in amounts in excess of the upper limit of 1% by weight specified in present Claim 1.

There is no information whatsoever in D3 which would suggest that by the conjoint presence of low amounts of acid units and low amounts of certain anionic emulsifiers self-emulsifiable resin powder compositions could be prepared, which upon reconstitution would provide stable aqueous dispersions rendering surface coatings having satisfactory water resistance.

4.1.3.3 Hence, neither of the documents D1 and D3 offer any clue to the solution of the existing technical problem as specified in present Claim 1, whose subject-matter, therefore, is non-obvious.

4.1.4 The same conclusion applies to the subject-matter of the independent Claims 2 and 3, which comprise the same compositional features as Claim 1, and to the dependent Claims 6 to 8.

4.2 Claim 4

4.2.1 Closest prior art

In view of the fact that Claim 4 relates to an aqueous dispersion (surface coating composition), which is by no way restricted to the use of a self-emulsifiable resin powder composition according to Claim 1 (cf. point 3.2 supra), D4 represents the closest prior art.

Unlike the dispersions according to present Claim 4, those which are disclosed in D4 contain a much higher amount of emulsifier (Example 3: 3.73% of sodium alkyl sulfate; cf. points 3.2.2.1 and 3.2.2.2 supra).

4.2.2 Problem and solution

Starting from D4, the problem underlying the subject-matter of present Claim 4 was the provision of further aqueous surface coating compositions which are stable and render surface coatings having satisfactory water resistance.

According to Claim 4 this problem is to be solved by the conjoint presence of low amounts of acid units in the copolymer and of low amounts of certain anionic emulsifiers.

Since this problem is essentially the same as that for the subject-matter of Claim 1, the considerations concerning its solution set out in point 4.1.2 supra also apply here.

4.2.3 Obviousness

Again, this issue turns onto the question whether the prior art contains any suggestion towards the solution of the existing problem by the conjoint presence of low amounts of acid units and low amounts of the specified emulsifiers.

The further prior art documents concerned with the provision of aqueous coating dispersions which are to be considered in this respect are particularly D3a and D5. Document D2, although concentrating on the preparation of re-emulsifiable resin powders may also be considered to be relevant.

4.2.3.1 Document D3

According to its Claim 1, and also according to the respective information in D3a (cf. Claim 1), this document requires the use only of low amounts of acid monomer. As to the amount of emulsifier used in the resin dispersion (as opposed to the paint dispersion: cf. point 4.1.1.2 supra), D3 solely relies on D3a, where a range of 2 to 12% by weight of emulsifier is disclosed (column 5, lines 67 to 73).

Thus, D3 does not suggest the use of both low amounts of acid units and low amounts of emulsifier.

This conclusion is further reinforced by the addition, according to Claim 1 of D3, of a dispersion agent in amounts of from 0.5 to 1% by weight, because this agent, whatever its ionic character, increases the overall amount of emulsifier in the latex and cannot, therefore, suggest the use of even lower amounts of emulsifier as those used according to D3a (cf. point 3.1.4(vi) ad (3) supra).

4.2.3.2 *Document D5*

This document again discloses aqueous dispersions of copolymers comprising low amounts of acid units, but amounts of emulsifier which are in excess of the maximal 1% by weight required by present Claim 4 (cf. point 3.2.3.1 supra).

The skilled person heading for good latex stability and good water resistance of the resultant coatings would not find any clue in this document that these objects could be achieved by reducing the emulsifier amount. Moreover, D5 requires the additional presence of an acetoacetate component (D) (cf. Claim 1), thus leading in the direction of an enhancement of the polar character, which is contrary to the "polarity" effect connected with low amounts of acid units and low amounts of emulsifier.

4.2.3.3 *Document D2*

The only citation in the proceedings which discloses the use of amounts of emulsifiers as low as those according to present Claim 4 is document D2 (cf. point 4.1.1.1 supra).

However, according to Claim 1 of this document the copolymers comprise 10 to 50% by weight of hydrophilic monomers (c), e.g. acrylic acid or methacrylic acid (page 5, lines 16 to 31).

While, theoretically, up to 90% of the hydrophilic monomers (c) might be non-acidic (e.g. amides), such copolymers are not exemplified and, consequently, it could only be speculated what influence such comonomers in such amounts would have on the overall composition of a latex prepared therefrom. The skilled person is, thus, bound to rely on the actual enabling disclosure of D2, which teaches him to use more than 10% by weight of acid monomers (Examples 1 and 5: 12,9% methacrylic acid; Example 3: 14.8% methacrylic acid).

Moreover, as pointed out by the Respondent during the oral proceedings, D2 requires the presence of up to 5% by weight of a protective colloid like e.g. polyvinyl sulfonate (cf. component (e) of Claim 1), which - similarly to an emulsifier or dispersion agent - aids in stabilizing the latex. Such protective colloids are not within the definition of present Claim 4 and, according to the patent in suit, their addition is not desired. (cf. column 1, lines 47 to 55: "... without the necessity of using additional surfactants.").

To summarize, document D2 does not suggest copolymers comprising the low amounts of acid comonomers specified in present Claim 4 in dispersions comprising the low amounts of anionic emulsifiers specified in this claim.

4.2.3.4 Hence, neither of the documents D2, D3a and D5 offer any clue to the solution of the existing technical problem as specified in present Claim 4, whose subject-matter, therefore, is non-obvious.

4.2.4 The same conclusion applies to the subject-matter of Claim 5, which is dependent upon Claim 4.

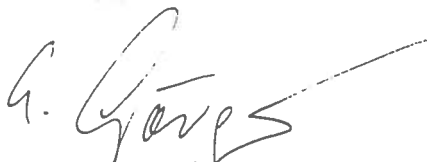
5. Thus, neither of the grounds of opposition adduced by the Appellant prejudice the maintenance of the patent in suit in the form as granted.

### Order


For these reasons it is decided that:

The appeal is dismissed

The Registrar:

  
E. Görgmaier

The Chairman:

  
C. Gérardin

