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Datasheet for the decision of 24 October 2007

Case Number: T 0909/04 - 3.3.03

Application Number: 96400730.6

Publication Number: 0736573

IPC: C08L 33/04

Language of the proceedings: EN

Title of invention:
Aqueous polymer dispersions

Patentee:
CRAY VALLEY LIMITED

Opponent:
DSM NeoResins B.V.
BASF Aktiengesellschaft

Headword:
-

Relevant legal provisions (EPC 1973):
EPC Art. 54, 56
RPBA Art. 10a(1)(2), 10b(1)(3)

Keyword:
"Novelty (yes)"
"Inventive step - problem and solution (main request: no, auxiliary request 10: yes)"
"Late filed requests (not admitted)"

Decisions cited:
-

Catchword:
-

Case Number: T 0909/04 **-** 3.3.03

DECISION
of the Technical Board of Appeal 3.3.03
of 24 October 2007

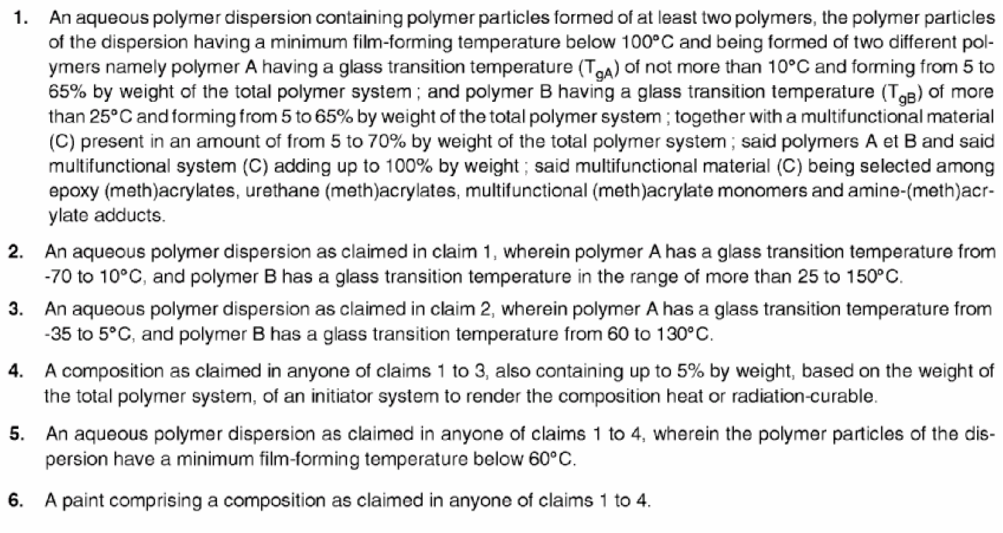
Appellants: (Opponent I)	DSM NeoResins B.V. Sluisweg 12 NL-5140 AC Waalwijk (NL)
Representative:	Schmitt, Maja DSM Intellectual Property DSM IP Assets BV Geleen Office PO Box 9 NL-6160 MA Geleen (NL)
(Opponent II)	BASF Aktiengesellschaft Patente, Marken und Lizenzen D-67056 Ludwigshafen (DE)
Representative:	-
Respondent: (Patent Proprietor)	CRAY VALLEY LIMITED Waterloo Works Machen Newport Gwent NP1 8YN (GB)
Representative:	Chaillot, Geneviève Cabinet Chaillot 16-20, avenue de L'Agent Sarre B.P. 74 F-92703 Colombes Cédex (FR)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office of 7 April 2004 and posted 24 May 2004 rejecting the opposition filed against European patent No. 0736573 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: C. Idez
Members: A. Däweritz
E. Dufrasne

Summary of Facts and Submissions

I. The grant of European patent No. 0 736 573 in respect of European patent application No. 96 400 730.6, filed on 4 April 1996 and claiming the priority of 5 April 1995 of an earlier application filed in the United Kingdom (GB 9507078), was announced on 21 March 2001 (Bulletin 2001/12). The patent was granted with six claims reading as follows:



1. An aqueous polymer dispersion containing polymer particles formed of at least two polymers, the polymer particles of the dispersion having a minimum film-forming temperature below 100°C and being formed of two different polymers namely polymer A having a glass transition temperature (T_{gA}) of not more than 10°C and forming from 5 to 65% by weight of the total polymer system ; and polymer B having a glass transition temperature (T_{gB}) of more than 25°C and forming from 5 to 65% by weight of the total polymer system ; together with a multifunctional material (C) present in an amount of from 5 to 70% by weight of the total polymer system ; said polymers A et B and said multifunctional system (C) adding up to 100% by weight ; said multifunctional material (C) being selected among epoxy (meth)acrylates, urethane (meth)acrylates, multifunctional (meth)acrylate monomers and amine-(meth)acrylate adducts.

2. An aqueous polymer dispersion as claimed in claim 1, wherein polymer A has a glass transition temperature from -70 to 10°C, and polymer B has a glass transition temperature in the range of more than 25 to 150°C.

3. An aqueous polymer dispersion as claimed in claim 2, wherein polymer A has a glass transition temperature from -35 to 5°C, and polymer B has a glass transition temperature from 60 to 130°C.

4. A composition as claimed in anyone of claims 1 to 3, also containing up to 5% by weight, based on the weight of the total polymer system, of an initiator system to render the composition heat or radiation-curable.

5. An aqueous polymer dispersion as claimed in anyone of claims 1 to 4, wherein the polymer particles of the dispersion have a minimum film-forming temperature below 60°C.

6. A paint comprising a composition as claimed in anyone of claims 1 to 4.

In this decision, references to passages in the patent in suit as granted will be given underlined in square brackets, eg Claim [1], § [0001] and Example [1], those in underlined *italics* to the application text as originally filed.

II. On 12 and 19 December 2001, respectively, two Notices of Opposition were filed, in which revocation of the patent in its entirety was requested. Opponent I (O-I) raised an objection under Articles 100(a) EPC, asserting lack of inventive step, whilst Opponent II (O-II) based its opposition on the grounds according to (i) Articles 100(a) EPC, alleging lack of novelty and lack of inventive step, and (ii) Article 100(b) EPC with references to the allegedly insufficient definition of the minimum film-forming temperature (MFT) in the [claims] and the wrong dimension of the König (or Koenig) hardness (KH) as given in the [examples].

In order to support their respective objections, the Opponents relied *inter alia* on the following documents:

D1(I): EP-A-0 466 409,
D2(I): Dr. K.A. Wood, "Acrylic Emulsions for Radiation Curing Offer Formulation Ease", Modern Paint and Coatings, Sept. 1994, pages 68 to 72
D3(I): Dr. K. Wood, "Waterborne Radiation Curable Coating for Wood", Radiation Curing, Vol. 183, No. 4322, 10 Feb. 1993, pages 34 to 37,
D6(I): Product Bulletin for Sartomer SR-351, 2055 R.11/98, (Trimethylolpropane Triacrylate/ TMPTA),
D8(I): Product Bulletin for Sartomer SR-494, 2073 R.11/98 (Ethoxylated (4) Pentaerythritol Tetraacrylate),
D2(II): EP-A-0 624 610,
D3(II): DE-A-2 163 461,
D6(II): US-A-4 107 013 (=D4(I)) and
D7(II): EP-A-0 609 756.

Oral proceedings were held on 7 April 2004 before the Opposition Division on the basis of, on the one hand, the set of claims as granted (Main Request) and, on the other hand, thirty-two further sets of claims (Auxiliary Requests Nos. 1 to 32), submitted with the letter of 6 February 2004.

III. In the decision announced at the end of the hearing, the oppositions were rejected. The reasons for this decision were issued in writing on 24 May 2004.

(1) In particular, the Opposition Division took the view that the MFT objection of Opponent II did not touch the issue of insufficient disclosure and that the objection concerning the KH related to Article 84 EPC rather than to the issue of insufficient disclosure (cf. section II, above). Consequently, the objection under Article 100(b) EPC was rejected.

(2) Nor were the documents, which had been cited with respect to novelty, ie D3(II) and D6(II), considered to be anticipatory for the subject-matter claimed.

According to the decision, D3(II) relating to an aqueous dispersion of core/shell particles, wherein the glass transition temperature (T_g) of the core should be at least 50°C below the T_g of the shell, neither disclosed the respective T_g values of the core or shell, nor any MFT values. Nor were assumptions, presented by O-II without evidence, accepted, that the T_g values of the core or shell or the MFT of the intermediate product in Example 32 of D3(II) would fall within the ranges claimed.

It was furthermore held in the decision that the general disclosure of D6(II) neither taught the weight ratio of the core to the shell, nor core and shell polymers having different T_g values as claimed. Nor were the arguments of O-II deemed convincing, that the T_g values of the high molecular weight particle latex and the crosslinking polymer contained in the blend of

Example 8B of the document should, in view of their dependency on the applied measuring method and because of measuring inaccuracy of these methods, be considered as falling within the ranges as claimed.

(3) According to the decision, the problem to be solved vis-à-vis D1(I), which had been accepted by both Opponents as the closest piece of prior art, was seen in the provision of aqueous polymer dispersions having improved blocking resistance, hardness and chemical resistance whilst maintaining a low MFT (No. II.3.2).

(4) Document D1(I) disclosed a film forming polymeric binder useful in aqueous coating compositions (eg interior paints) which could be applied at low temperature while providing good block resistance. They comprised a blend 20 to 60 weight percent of a hard emulsion polymer having a T_g of >20°C (preferably 25 to 60°C) and 80 to 40 weight percent of a soft emulsion polymer having a T_g of <20°C (preferably 10 to -5°C) (D1(I): Claim 1). The MFT of the blend was <100°C (D1(I): Table 4). The document did not, however, disclose the presence of 5 to 70 weight percent of the polymer system of a multifunctional material C (MFM).

Document D3(I) discussed, according to the decision, acrylic latices (Primal® E-3074) in combination with a multifunctional acrylate (MFA) such as TMPTA, PPTTA or Santomer SR494 in a ratio of 80:20 to 60:40. Due to the addition of the MFA, hardness and chemical resistance of the system were increased.

Based on these findings, the Opposition Division held that the skilled person would have expected that the combination of the teachings of D1(I) and D3(I) would lead to an increase of hardness and chemical resistance while maintaining the good block resistance already achieved in D1(I). However, the improved level of blocking resistance, chemical resistance and hardness as demonstrated by the results in <u>Examples [7] to [9]</u> in comparison with comparative <u>Example [2]</u> was considered by the Opposition Division not merely as an additional effect and a fortuitous bonus, but as a synergistic effect extending beyond a simple additional effect (decision: paragraph bridging pages 7 and 8).

As far as the other cited documents did not merely relate to technical background, they were also commented on by the Opposition Division. Thus, the combination of D1(I) and D7(II) was deemed not to provide more information than the combination of D1(I) and D3(I), considered above. D2(II) did not even touch the above technical problem (section III(3), above), and D2(I) referred only to an increase of the hardness and of the solvent resistance by adding MFA to water-borne acrylic systems. According to D6(II), the addition of MFA to acrylic latices led to coatings having good adhesion and flexibility. D3(II) did not concern the same technical field, as it dealt with particles and moulded articles formed thereof.

It was concluded that none of the further documents would, in combination with D1(I), render the claimed subject-matter obvious.

(5) Hence, the oppositions were rejected and it was held that there was no need to consider any one of the auxiliary requests.

IV. On 19 and 26 July 2004, respectively, Notices of Appeal were filed against this decision by Opponent I/ Appellant I (AP-I) and Opponent II/Appellant II (AP-II), respectively, each together with the payment of the prescribed appeal fee.

V. The Statement of Grounds of Appeal of AP-I was received on 30 September 2004 (SGA-I), that of AP-II on 2 October 2004 (SGA-II).

(1) Appellant I additionally referred to

D9(I): J.M. Loutz et al., "Waterbased UV-EB Coating Systems", Polymers Paint Colour Journal, Vol. 178 (27 July 1988), No. 4219, pages 571 to 573 and 580 and
D10(I): Experimental Evidence/Statutory Declaration by Tijs Nabuurs, an employee of AP-I

(2) Whilst accepting the findings of the Opposition Division concerning novelty, AP-I continued with respect to inventive step: "The Appellant acknowledges that the decision of the Opposition Division does not appear to be incorrect, however in light of new evidence the Appellant believes that the objections raised by the Opposition Division are overcome." (SGA-I: page 3, No. 3).

(3) In order to support its inventive step objection, Appellant I referred again to D1(I) which provided binders for coating compositions and allegedly had the most relevant features in common with and was directed to the same purpose as the patent in suit (cf.

section III(3), above). Allegedly, the aqueous coating compositions of D1(I) (section III(4), above), although free of volatile organic solvents, had a low MFT, but nevertheless maintained a good hardness and blocking resistance of the surface coating resulting therefrom. D1(I) would also teach that blocking resistance was improved by increasing the weight percentage of the hard phase (ie high T_g polymer; page 9, lines 49 to 50). Hence in summary, D1(I) would disclose all features of the claims except for the presence of MFM.

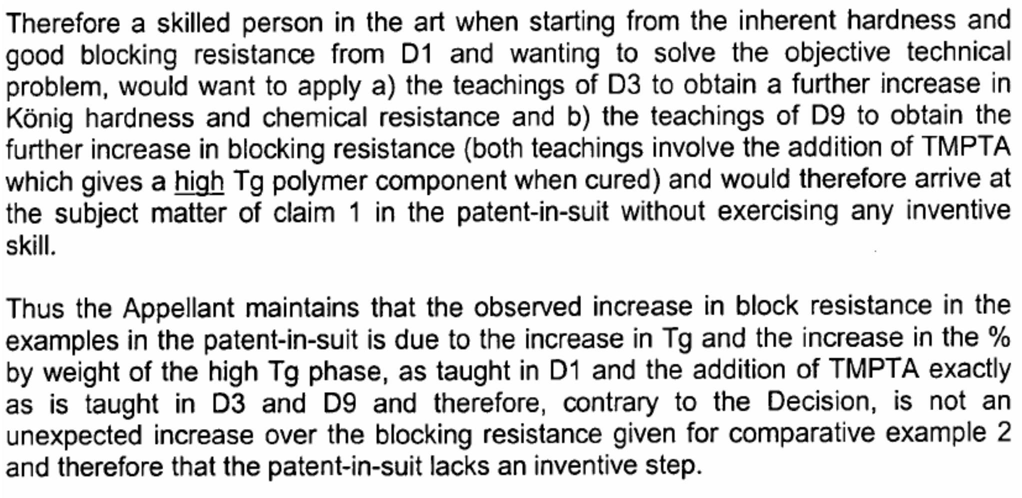
(4) Whilst acknowledging that a comparison of Examples [7], [8] and [9] with comparative Example [2] or comparative Examples [4], [5] and [6] with comparative Example [1], respectively, showed a slight increase in blocking resistance at 20°C, an increase in KH and in chemical resistance, with a minimum MFT of <100°C, when a MFM had been added, AP-I then referred to D3(I), which would teach how to provide good hardness and good chemical/solvent resistance for aqueous coating compositions in general, and for water-borne acrylics in particular, by adding the same MFM as exemplified in the patent in suit.

As discussed before the Opposition Division, it would have been well-known that TMPTA on curing made a high T_g contribution of 62°C (D6(I)). The observed improvements in the examples of the patent in suit would merely be the obvious consequence of an increase in the amount of an interpenetrating polymer network formed by MFM exactly as taught in D3(I) (page 37, Table 3) or of the overall increase in the concentration of high T_g material in the final cured coating, exactly as taught in D1(I) (page 9, lines 49 to 50).

(5) In view of the fact that it had not been aware, at the oral proceedings before the Opposition Division, of a document establishing directly and unambiguously the link between the blocking resistance and the presence of a crosslinker (section 5.5.3 of the Minutes), D9(I) was filed, with its SGA-I, to fill this gap. Like D1(I) and D3(I), D9(I) referred also to binders for aqueous coating compositions and to the fact that any emulsion could be characterised by the MFT and the T_g. The disadvantages occurring, when a composition having a low MFT and a low T_g was used, could not be avoided by simply increasing these two parameters, because this might require high temperature curing resulting in process difficulties (SGA-I: item 5.6, first paragraph).

(6) To overcome these problems UV reactive coalescing agents (CA) such as TMPTA had been investigated (D9(I): page 572, column 1, paragraph 1) and compared with standard CA compounds (butyl glycol, Texanol). Thereby it had been found that film stiffness was improved when butyl glycol had been replaced by TMPTA which had the ability to homopolymerise (*loc. cit.*, paragraph 4). Moreover, it was disclosed in D9(I) that the use of TMPTA resulted in a striking advantage of the system with regard to the increase of resistance to blocking tendency (*loc. cit.*, paragraph 5).

On the basis of these details of D9(I), the following arguments were submitted by AP-I (SGA-I, item 5.6):



Therefore a skilled person in the art when starting from the inherent hardness and good blocking resistance from D1 and wanting to solve the objective technical problem, would want to apply a) the teachings of D3 to obtain a further increase in König hardness and chemical resistance and b) the teachings of D9 to obtain the further increase in blocking resistance (both teachings involve the addition of TMPTA which gives a high Tg polymer component when cured) and would therefore arrive at the subject matter of claim 1 in the patent-in-suit without exercising any inventive skill.

Thus the Appellant maintains that the observed increase in block resistance in the examples in the patent-in-suit is due to the increase in Tg and the increase in the % by weight of the high Tg phase, as taught in D1 and the addition of TMPTA exactly as is taught in D3 and D9 and therefore, contrary to the Decision, is not an unexpected increase over the blocking resistance given for comparative example 2 and therefore that the patent-in-suit lacks an inventive step.

(7) In order to support these arguments, AP-I additionally filed the comparative data in D10(I), which contained four compositions "equivalent to comparative example 2 and examples 7, 8 and 9 of EP0736573 B1", and concluded from the results provided, that no problem had been solved and that, therefore, no inventive step had been demonstrated.

(8) Appellant II maintained in SGA-II its objections to lack of novelty vis-à-vis D3(II) and D6(II). However, its novelty objection on the basis of D6(II) was later withdrawn (section XIII, below).

The other novelty objection was maintained on the basis of a feature analysis of Claim [1] in comparison with particular features disclosed in different passages of D3(II) and, in particular with Example 32 of the document. To this end, it additionally submitted an experimental report with a letter dated 2 February 2005 (as announced in SGA-II) and argued that the experiment in the report (i) would be a repetition of Example 32 of D3(II), a modification of Example 1, carried out in accordance with the description of the two-stage reaction of this latter example, and (ii) would inherently disclose all the features of Claim [1]. Each of the resulting polymers of the two polymerisation stages would have shown the respective T_g value as required by Claim [1]. Moreover, during the second stage of the polymerisation reaction, the content of free 1,3-butylene dimethacrylate (BDDMA), corresponding to the MFM of Claim [1], would have reached a value of up to 5 % by weight, and the MFT of a specimen withdrawn from the reaction mixture, when the monomer feed of the second stage had been stopped after 60 min, would have shown a MFT of 9°C.

(9) Moreover, AP-II also maintained its objection of lack of inventive step, for which it considered in its SGA-II either D2(II) or D7(II) as closest state of the art, repeated those parts of its arguments (feature analyses of Claim [1] and of D2(II) and D7(II), respectively) as already presented on pages 6/7 and 9 of its Notice of Opposition and argued that the person skilled in the art would have arrived at the subject-matter of Claim [1] in an obvious way from different combinations of its cited documents. These arguments did not, however, play any role in the further proceedings. Rather, AP-II referred to the arguments provided by AP-I.

VI. The arguments of both Appellants were disputed by the Respondent in its letter dated 7 June 2005.

(10) Thus, it took the view, that the novelty objection of AP-II had been based on a combination of features arbitrarily selected from different passages of D3(II). Since this combination relied on by AP-II was only one out a large number of potentially conceivable

combinations, AP-II would have failed to demonstrate the complete or explicit anticipation of Claim [1] by a specific passage of D3(II).

With regard to the alleged repetition of Example 32 of the document by AP-II, the Respondent disputed that the experiment would have been a valid repetition of Example 32 of D3(II). Thus, the feed of the monomer mixture of the second polymerisation stage had been commenced at a conversion of 68% of the monomers of the first stage, whereas in the procedure of Example 1 of D3(II), ie the basis of Example 32, the conversion had been between 85 and 90% at this point. The Respondent, furthermore, contested that the content of BDDMA of 4.9% measured after 60 min of the second polymerisation stage had fulfilled the concentration requirement of component C of Claim [1] and that the composition of an intermediate product, which had been recovered during the polymerisation, but had not been disclosed in D3(II) as an isolated and identifiable product, could be acknowledged as an implicit anticipation of the claimed subject-matter. Therefore, it concluded that the alleged lack of novelty had not been proved.

(11) With regard to the arguments of AP-I concerning inventive step vis-à-vis a combination of D1(I) and D3(I), the Respondent took the view that they had been based on an *ex post facto* analysis. Moreover, it referred to the different results in comparative Examples [4], [5] and [6] in comparison with those according to the subject-matter of the patent in suit, which would show that the addition of the MFM alone did not provide the solution of the problem underlying the patent in suit, but that specific limitations, in

particular in respect of the T_g values of both polymers had additionally to be introduced.

(12) With regard to D9(I), the Respondent argued that the document would only concern improvements of blocking resistance by replacing classic CA compounds by UV-reactive CA compounds in classic systems. However, a double T_g system as described in D1(I) did not need any CA. Hence, the teaching of D9(I) could not be applied in an obvious manner to systems which did not involve the problem of classic systems.

Nor would the synergy effect observed with respect to improvements of the blocking resistance in addition to those in hardness and chemical resistance (as acknowledged in the decision under appeal) have been derivable from the prior art.

(13) Furthermore, the Respondent submitted Auxiliary Requests Nos. 1 to 33 and experimental data obtained in repetitions of the Examples [2], [7], [8] and [9]. Whilst, however, TMPTA had again been used as the MFM as in the [examples], the blocking measurements reported had been carried out in more stringent conditions than those in ASTM D-4946 as used in the patent in suit (application of pressure of 700 g/cm^2 at 80°C for 1h).

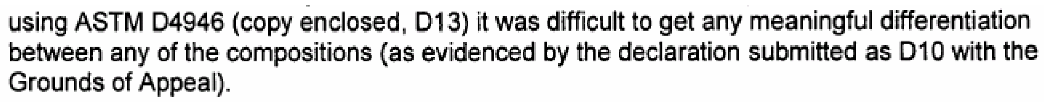
According to the Respondent, the Auxiliary Requests were those filed in the opposition proceedings except for the additional Auxiliary Request No. 4.

VII. In reply to these arguments and the above experimental report, AP-I submitted in a letter dated 19 December 2005 the following documents

D9B(I): modified version of D9(I), machine typed and undated,
D11(I): Product Bulletin of Sartomer SR-9035, 2100 R.12/98, (Ethoxylated (15) Trimethanolpropane Triacrylate),
D12(I): ASTM D-2793-69 (Reapproved 1987) and
D13(I): ASTM D-4946-89 (Reapproved 1999)

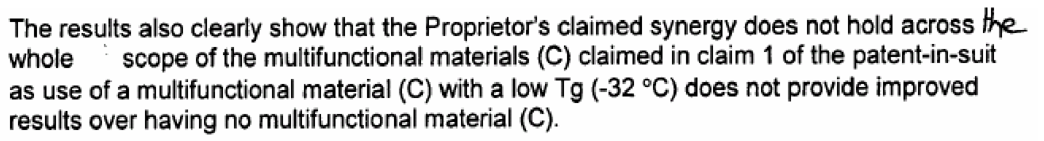
and disputed the arguments of the Respondent. In particular, it disputed the presence of a synergism over the whole breadth of the claimed range. Furthermore, it submitted a series of new experiments to this end. In this series, it had repeated comparative Example [2] and Examples [7], [8] and [9] with 0, 10, 20 and 30 wt.-%, respectively, of TMPTA (T_g = 62°C) as in the patent in suit and, additionally, with 10, 20 and 30 wt.-% of the compound of D11(I) (T_g = -32°C), which was also covered by Claim [1].

Moreover, the blocking was measured in accordance with D12(I), ie under more severe conditions than those of D13(I) used in the patent in suit, because, according to AP-I, by



> using ASTM D4946 (copy enclosed, D13) it was difficult to get any meaningful differentiation between any of the compositions (as evidenced by the declaration submitted as D10 with the Grounds of Appeal).

The resulting data were commented on by AP-I as follows:



> The results also clearly show that the Proprietor's claimed synergy does not hold across the whole scope of the multifunctional materials (C) claimed in claim 1 of the patent-in-suit as use of a multifunctional material (C) with a low Tg (-32 °C) does not provide improved results over having no multifunctional material (C).

VIII. With regard to the summons (dated 11 June 2007) for oral proceedings on 24 October 2007, the Respondent submitted with a further letter dated 31 July 2007 a further report comprising four examples, each comprising tests of four compositions made according to the description of Examples [2], [7], [8] and [9] with different MFM compounds (in Tables 1 and 2: two examples with ethoxylated (3) TMPTA, in Table 3: one example with ethoxylated (4) pentaerythritol tetraacrylate and in Table 4: a further example with propoxylated (3) TMPTA, respectively). Whilst in the example of Table 1 polymers A and B were those as used in the examples of the patent in suit, in the other examples, each of the polymers A and B had been modified by 10% of acetoacetoxyethyl methacrylate (AAEM). The blocking measurements were carried after storage under a pressure of 700 g/cm^2 at 70°C for 1h.

IX. In a letter dated 24 August 2007, AP-I wondered which purpose the tests, referred to in the last paragraph, above, were to serve, announced that it would repeat them and would provide the results as soon as possible. Such results were, however, never received.

X. In a still further letter dated 4 September 2007, the experimental report of section VIII, above, was refiled by the Respondent and complemented by the addition of one further example in a new Table 5, wherein the tests of Table 4, mentioned above, had been repeated with the modification that polymers A and B used therein did not contain AAEM moieties. Furthermore, the Respondent commented on the arguments and experimental data presented by AP-I:

(14) The description of the measurements in the report of section VII, above, would have insufficiently been described and could not, therefore, be repeated.

(15) The Respondent denied that the MFM would be part of the hard phase of the claimed polymeric system, but it would constitute a phase quite distinct from the polymeric phases of the dispersion.

(16) The T_g ranges of the polymers in D1(I) were different from those in Claim [1]. Moreover, D1(I) incited not to use any CA compound.

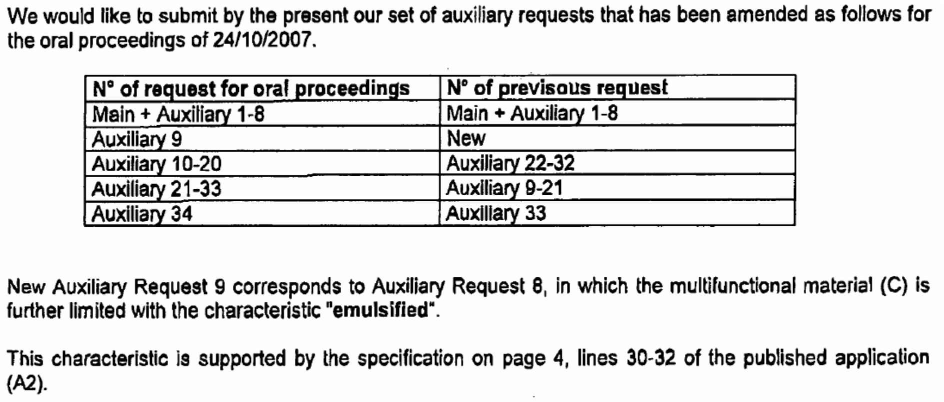
(17) The technical problem to be solved by D1(I) was seen in avoiding the use of organic CA compounds, whilst the problem of D9(I) had been the replacement of an organic CA by a novel one.

(18) D9(I) would not teach in a general way that the addition of TMPTA could improve the blocking resistance of a double T_g latex, let alone that the MFA compounds as defined in the patent in suit were suitable for this purpose.

XI. Appellant I, in a further letter dated 27 September 2007, maintained that in D1(I) mention had been made of an improvement of the block resistance with increasing amounts of hard phase polymer (with a high T_g) and that, according to D9(I), ie a document in the same technical field, conventional CA agents were undesirable, because they would plasticize the composition and, when they were used, a post heating was necessary to remove them. This problem would, however, have been met according to

D9(I) by using a reactive CA (ie TMPTA) which could be UV cured (= homopolymerised) and which did not, thus, induce residual plasticization due to its hardness.

XII. In a letter dated 22 October 2007, received by fax on the same date, thirty-five sets of claims were filed by the Respondent. The essentials of the letter read as follows:



We would like to submit by the present our set of auxiliary requests that has been amended as follows for the oral proceedings of 24/10/2007.

N° of request for oral proceedings	N° of previsous request
Main + Auxiliary 1-8	Main + Auxiliary 1-8
Auxiliary 9	New
Auxiliary 10-20	Auxiliary 22-32
Auxiliary 21-33	Auxiliary 9-21
Auxiliary 34	Auxiliary 33

New Auxiliary Request 9 corresponds to Auxiliary Request 8, in which the multifunctional material (C) is further limited with the characteristic **"emulsified"**.

This characteristic is supported by the specification on page 4, lines 30-32 of the published application (A2).

XIII. The oral proceedings were held before the Board on 24 October 2007. In essence, the parties reiterated their previous arguments as submitted in writing. Therefore, only those points as presented during the hearing, which have been of particular importance for this decision, will be summarised herein below.

(19) At the onset of the oral proceedings before the Board, the Respondent requested that (i) the additional documents, namely D9(I) and D9B(I), and (ii) the experiments as filed by both Appellants (sections V(7), V(8) and VII, above) not be admitted to the proceedings because of their late-filing and their lack of relevance, and argued in this respect that (iii) Opponent I had admitted in the hearing before the Opposition Division that there had been no documents suggesting a direct and unambiguous link between the blocking resistance and the presence of a cross-linking

agent (reference was made to Nos. 5.5.3 and 5.5.4 of the minutes of the hearing of 7 April 2004). Furthermore, it requested that (iv) its experimental reports submitted with its letters of 7 June 2005, 31 July 2007 and 4 September 2007 (sections VI(4), VIII and X, above), respectively, be admitted.

(20) By contrast, AP-I brought forward (i) that the statement in the previous hearing (item (iii) of the previous paragraph) corresponded only to the actual situation on that date, (ii) that D9(I), however, provided this hitherto missing link, and (iii) that both D9(I) and D10(I) had been cited in direct response to the decision under appeal in the SGA-I, so that they had been filed in due time. The further documents would refer to common general knowledge. Moreover, AP-I indicated that, in its view, document D9B(I) was not necessary for its case and that it could be disregarded.

With regard to the additional experiments of the Respondent and the arguments based thereon (item (iv) in section XIII(1), above), AP-I argued that its own additional experimental data of 19 December 2005 (section VII, above) were necessary to support its position in these oral proceedings. Moreover, if the Respondent's experiments were to be admitted, then this should also happen with the Appellants' experiments.

(21) After deliberation, the parties were informed that D9(I), D10(I), D11(I), D12(I) and D13(I) and the experiments of all parties filed in the course of the appeal proceedings were admitted into the proceedings.

(22) Then, the novelty issue was discussed, mainly on the basis of the experiment of Appellant II (section V(8), above). AP-II set out that this experiment had been submitted in order to refute the findings in the decision under appeal concerning its novelty objection.

This discussion focused on the fact that, whilst, according to the detailed description of Example 1 of D3(II), which formed the basis also for Example 32 of the document, the second reaction stage was started by commencing the feed of the second monomer mixture, when the conversion of the monomers of the first stage had reached 85 to 90%, the experimental report of AP-II reported a conversion of those first monomers of about 68% at the commencement of the second monomer feed.

Appellant II explained this difference with the method of determination of the monomer content by gas chromatography used by the Appellant, which took some time in which the reaction continued. Therefore, the second monomer feed had been started at 25 min after the termination of the feed of the first mixture (which had taken 25 min).

The Respondent, however, argued that the experiment was not a true repetition of Example 32 of D3(II), as could eg be seen from the discrepancy between the degrees of conversion, when the feed of the monomers for the second polymerisation stage had been commenced (see above). Namely, the first stage of the alleged repetition using the same monomers in the same ratios should have been run in the absolutely identical way as described in Example 1 of D3(II). However, this had not evidently been the case. Therefore, the experiment was not, in the Respondent's view, valid to demonstrate the alleged anticipation.

Appellant I did not comment on this issue, nor were further remarks thereto given by the other parties.

(23) In the discussion about the question of inventive step, which focused on the question of blocking resistance, the position of the Appellants was mainly represented by AP-I, who started from D1(I) as the closest piece of the prior art and additionally pointed out that D1(I) and D9(I) related to the same field of the art as the patent in suit. According to the Appellant, D1(I) furthermore referred to the same objectives as the patent, ie to the provision of coating compositions which could be applied at low temperatures while providing good block resistance and having good hardness (D1(I): page 2, line 10, page 3, lines 9/10 and page 4, lines 22 to 25), without need of using hitherto necessary volatile organic solvent CA compounds, which had caused environmental difficulties (D1(I): page 2, lines 50, 51, 57 and 58). AP-I additionally referred to the MFT values shown in Tables 4 and 5 on pages 9 and 10 of D1(I), all of which would have complied with the ranges of polymers A and B of the patent in suit. Thus, D1 would have the most features in common with the patent in suit.

According to AP-I, the technical problem to be solved with regard to D1(I) had been seen by the Respondent in the further increase of its coating composition in hardness and blocking resistance whilst maintaining a low MFT.

The solution for this technical problem would have been provided by D9(I) which suggested to use TMPTA as a CA, because it lowered the MFT by temporarily plasticizing the polymer and thus behaved like a very efficient CA. However, contrary to the hitherto used conventional CA compounds, there was no need to remove the TMPTA by heating in order to get rid of the "plasticizer", which had been necessary in the case of conventional CA, because it could, instead, be homopolymerised to a hard, non-plasticizing polymer, thereby providing as a "striking advantage ... the increase of resistance to blocking tendency." (D9(I): page 571, right column, third and seventh items, each indicated with a hyphen; page 572, left column, paragraphs 1, 4 and 5). Hence, the reader skilled in the art would derive from D9(I) that he could further improve the hardness and the blocking resistance of the coating compositions of D1(I).

Furthermore, Appellant I referred to the preferred ranges of the T_g values of the two polymers as disclosed in D1(I) (page 3, lines 2 to 4) in order to show that they complied with the respective ranges in the patent in suit.

(24) By contrast, the Respondent reiterated its previous arguments (section VI(3),above) by pointing out that the two documents would relate to completely different types of coating compositions, ie D1(I) concerning a two-component system comprising hard and soft polymers, which did not require, but rather avoided the presence of a CA, as opposed to D9(I), wherein one CA was replaced by another CA. In any case, it required the

presence of a CA in order to avoid vitrification of the polymer which had not been identified therein, so that it was not clear whether, if at all, it corresponded rather to polymer A or to polymer B of Claim [1].

Therefore, the skilled person would never transfer the disclosure of D9(I) to the different system according to D1(I). Moreover, the Respondent emphasised that hardness was independent from blocking resistance as shown in Examples [4] to [6] and [7] to [9] on page [10] and that it was not only the MFM which was required by Claim [1], but also the choice of two polymers having appropriate T_g values, in order to achieve the desired effect of improved blocking resistance. This effect had, however, been achieved as even confirmed by the experiments of AP-I.

(25) Then the results in the [examples] and in the experimental reports submitted by the Respondent (letters of 7 June 2005 and 31 July/4 September 2007) and by AP-I (D10 and letter of 19 December 2005) were controversially discussed with regard to the different values of the blocking properties of the control compositions free of MFM (corresponding to Example [2]), because the value of the respective control composition within a given experimental series formed the reference value for all evaluations of the other examples in this series. In none of these reports, reference had been made to properties of the resulting films other than blocking resistance. The further discussion about inventive step focused only on this property.

Thus, the Respondent argued, that the results provided by AP-I would be inconsistent within themselves and also with Example [2]. Moreover, the experimental report of 19 December 2005 of AP-I would be silent about the measuring conditions, eg the temperature, so that its results would be of no value, as they could not be compared with the results of the other series. By contrast, the results of the Respondent would be consistent, as could also be seen in the photos provided with the letter dated 7 June 2005. Therefore, the additional experimental data of AP-I would not provide a valid basis for the Appellant's arguments, which were based on the assertion that there would be no synergistic effect over the whole breadth of Claim [1], contrary to the decision under appeal.

Appellant I pointed out that its latest experiments had been measured in the conditions of D12(I) and evaluated in accordance with the scale on top of page [6], because the method of D13(I), as used in the patent in suit, had not been sufficiently discriminatory, as evidenced by the results in D10(I).

(26) After an interruption of the hearing for deliberation of the Board, and some additional discussion about the measuring conditions mentioned above, as used in the [patent] and in the additional experimental reports, the Board informed the parties that, in view of the additional experimental results showing that the asserted synergism had not been achieved in the full breadth of Claim [1], the technical problem to be solved with regard to D1(I) was seen in the provision of alternative coating compositions to those of D1(I) providing coatings showing similar properties as those achieved in D1(I).

(27) After some additional controversial comments of the parties on whether it had been obvious to combine the teachings of D1(I) and D9(I) and whether one would have arrived at something with the scope of the claims, the Board gave the decision that the subject-matter of the Main Request was not based on an inventive step and that this request was, therefore, refused.

(28) At this point, the Respondent filed a new Auxiliary Request No. 1, which was to replace the previous Auxiliary Request No. 1 as submitted with the letter dated 22 October 2007 (section XII, above). This letter had not, however, reached AP-I before its arrival at the premises of the EPO. Rather, AP-I got a copy of this letter only just before the oral proceedings.

The reason for the late filing of Auxiliary Request 1 was, according to the Respondent, its surprise about the decision on the Main Request, which it could not have foreseen.

This new request differed from the Main Request only by the characterisation of the MFM as being "emulsified" (at the first occurrence of this component in Claim 1).

Both Appellants requested that this request not be admitted because of its late filing. They furthermore, asserted lack of clarity.

(29) After deliberation, the Board did not admit the request. When this decision had been announced, the Respondent withdrew its Auxiliary Requests Nos. 2 to 8.

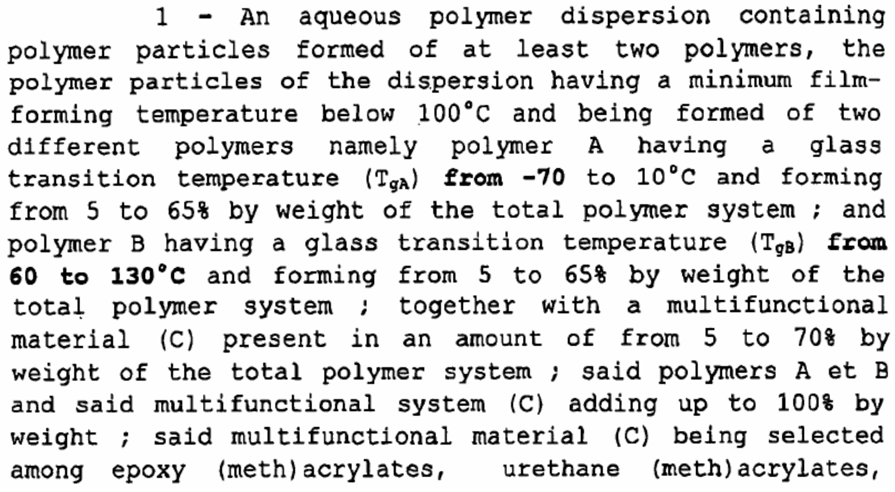
(30) Auxiliary Request No. 9, considered next, contained two claims, ie Claim 1 to the aqueous composition and Claim 2 to a paint comprising such as composition. Claim 1 differed from <u>Claim [1]</u> (Main Request) by the characterisation of the MFM as being "emulsified" and by the following passage at the end of the claim:

", said polymer dispersion having a particle size from 50 to 250 nm, the composition also containing up to 5% by weight, based on the weight of the total polymer system, of an initiator system to render the composition radiation-curable".

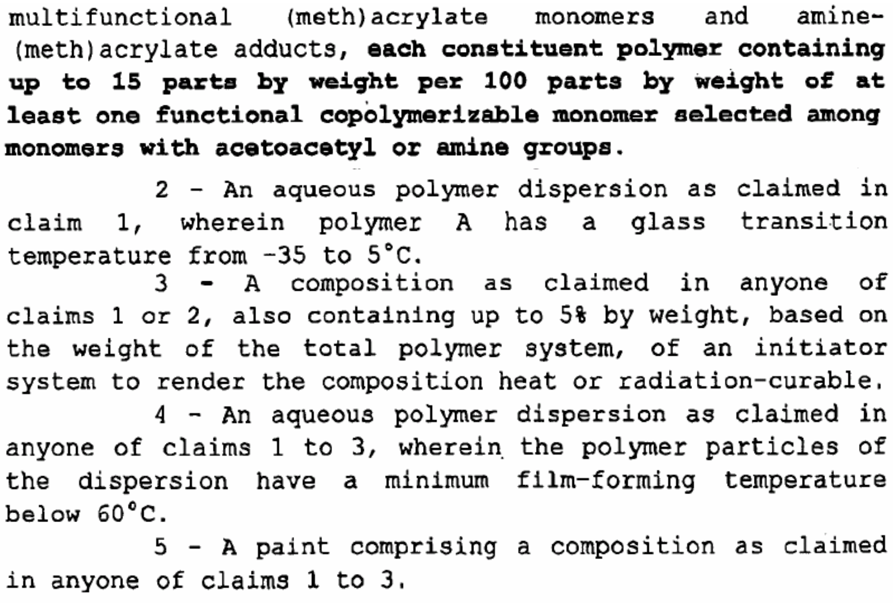
The Appellants requested not to admit this request as being late-filed, whilst the Respondent put its point of view that, according to jurisprudence of the Boards of Appeal, the Patent Proprietor would have the right to defend its patent in the best way possible.

After deliberation, the decision was given that the request was not admitted.

(31) The claims of the subsequent Auxiliary Request 10 had the following wording:



1 - An aqueous polymer dispersion containing polymer particles formed of at least two polymers, the polymer particles of the dispersion having a minimum film-forming temperature below 100°C and being formed of two different polymers namely polymer A having a glass transition temperature (T_{gA}) **from -70** to 10°C and forming from 5 to 65% by weight of the total polymer system ; and polymer B having a glass transition temperature (T_{gB}) **from 60 to 130°C** and forming from 5 to 65% by weight of the total polymer system ; together with a multifunctional material (C) present in an amount of from 5 to 70% by weight of the total polymer system ; said polymers A et B and said multifunctional system (C) adding up to 100% by weight ; said multifunctional material (C) being selected among epoxy (meth)acrylates, urethane (meth)acrylates,



multifunctional (meth)acrylate monomers and amine-(meth)acrylate adducts, **each constituent polymer containing up to 15 parts by weight per 100 parts by weight of at least one functional copolymerizable monomer selected among monomers with acetoacetyl or amine groups.**

2 - An aqueous polymer dispersion as claimed in claim 1, wherein polymer A has a glass transition temperature from -35 to 5°C.

3 - A composition as claimed in anyone of claims 1 or 2, also containing up to 5% by weight, based on the weight of the total polymer system, of an initiator system to render the composition heat or radiation-curable.

4 - An aqueous polymer dispersion as claimed in anyone of claims 1 to 3, wherein the polymer particles of the dispersion have a minimum film-forming temperature below 60°C.

5 - A paint comprising a composition as claimed in anyone of claims 1 to 3.

The Respondent pointed out that this request had already been filed during the opposition proceedings. Hence, the Appellants could not be taken by surprise.

After deliberation, the Board admitted this request.

Furthermore, the Respondent argued that Tables 1 and 2 and Tables 3 and 5, respectively, of the experimental reports of 31 July 2007 and 4 September 2007, respectively, (sections VIII and X, above) demonstrated a significant improvement of the blocking resistance, when each of the polymers A and B contained up to 15 parts by weight, per 100 parts by weight of the other ethylenically unsaturated monomers, of a functional copolymerisable monomer selected among monomers with acetoacetyl or amine groups, in other words, "modified by 10% of AAEM (AcetoAcetoxy Ethyl Methacrylate)". Reference was additionally made to the fact that two different MFA compounds had been used in these experiments.

The Appellants argued that no evidence had been provided that amine groups would provide such an improvement, that, moreover, D1(I) contained a reference to the fact that "The polymers may additionally be formed using monomers known to increase the adhesion of the polymer to substrate surfaces, also known in the art as adhesion promoters, such as for example ureido functional monomers" (D1(I): page 4, line 42) and that polymers containing such a monomer had been used in control examples in D1(I) (Table 5).

The further argument of the Appellants, that it would not be clear whether both polymers in the additional examples of the Respondent had to contain such functional monomer units, was disputed by the Respondent with the argument that the expression "each containing ..." could not be clearer, and it confirmed that both polymers A and B mandatorily contained the additional comonomer in amounts of up to 15% by weight. Furthermore, the Respondent set out that D1 neither did nor could suggest that there was an interaction between the functionalised polymers and the MFM to improve the blocking resistance.

XIV. Since Auxiliary Requests 1 to 8, filed with letter of 22 October 2007 (section XIII(10) and XIII(11), above), had been withdrawn by the Respondent at the oral proceedings, the requests of the parties were as follows:

The Appellants (Opponents 01 and 02) requested that the decision under appeal be set aside and that the patent be revoked.

The Respondent (Patent Proprietor) requested that the appeal be dismissed or, in the alternative, that the patent be maintained on the basis of the Auxiliary Request 1, filed at the oral proceedings, or of one of the Auxiliary Requests 9 to 34, filed with letter dated 22 October 2007.

Reasons for the Decision

1. The appeals are admissible.

Procedural matters

2. In view of the arguments of the parties concerning the question of admissibility of the additional documents and experimental data as submitted in the appeal proceedings, the Board decided to admit documents D9(I), D10(I), D11(I), D12(I) and D13(I) (all as submitted by AP-I) and the experimental data of 2 February 2005 (AP-II), 7 June 2005 (Respondent), 19 December 2005 (AP-I) and 31 July/4 September 2007 (Respondent) to the proceedings (sections XIII(1) to XIII(3), above).

3. According to the Statements of Grounds of Appeal (Articles 10a(1) and 10a(2) RPBA), the only issues to be considered in these appeal proceedings concern the questions of novelty and inventive step.

Main Request

4. The basis of the Main Request are the claims as granted.

Therefore, no questions arise with regard to Articles 123(2) and 123(3) EPC.

Novelty

4.1 Whilst the objection on the basis of D6(II) was withdrawn, Appellant II maintained and, in view of its experiment (section V(8) and XIII(4), above) allegedly being a repetition of Example 32 of D3(II), reiterated its novelty objection on the basis of D3(II).

4.1.1 In Example 32 (page 23 of D3(II)), the process of Example 1 of the document was repeated with the modification that in the second monomer mixture 10 mol % of methyl methacrylate (MMA) was replaced be an equimolar amount of BDDMA. The further particulars of this example are, therefore, found in Example 1 (pages 10 and 11) of the document.

Thus, in the first reaction stage, an aqueous solution of initiator was added to an aqueous emulsion of part of a first monomer mixture, and the mixture was heated to 45°C. After about 10 min, addition of the remainder of the first monomer mixture was begun at a rate so that the temperature of the reaction mixture was kept within the range of 47 to 50°C. After completion of the addition of this first monomer mixture, which had taken about 25 min, the reaction mixture was maintained at about 47°C for further 25 min.

Then, when the degree of conversion had been between 85 and 90% the drop-wise addition of a mixture containing water, emulsifier and the second monomer mixture to the reaction mixture was begun and continued for about

60 min, so that the reaction temperature was again held at 47 to 50°C. This temperature was kept thereafter for another 90 min. Then the latex thus obtained was cooled and neutralised with ammonia.

4.1.2 According to the experimental report of AP-II (section V(8), above), the reaction mixture, after the addition of the initiator and after having been heated to 45°C, was kept at 45°C for 10 min before the remainder of the first monomer mixture was added during 25 min at a temperature of 47 to 50°C. After termination of this feed the reaction mixture was kept at 47 to 50°C for further 25 min. Then, at this point, the feeding of second monomer mixture was started.

As explained by AP-II at the hearing (section XIII(4), above), the conversion at the starting point of the feed of the second monomer mixture had been about 68%. During this second polymerisation, the feed of the monomer mixture had lasted 60 min at a temperature of 47 to 50°C. Thereafter, this temperature had been kept for further 90 min before the mixture had been cooled to room temperature and neutralised with ammonia.

At the starting of the second monomer feed and at different moments of the second stage, samples had been taken and analysed (the amount of BDDMA added, solids content and free BDDMA).

4.1.3 The discrepancy between the reported conversions when the second monomer feed had been started in the description of D3(II) and in the experimental report is evident (85 to 90% vs. about 68%).

Moreover, the wording in the experimental report differs from the description in D3(II) by that, in Example 1 of the document, the reaction temperature at the first stage had not been maintained at 45°C for the first 10 min after the addition of initiator, ie before the feed of the remainder of the first monomer mixture began.

Moreover, according to the description in Example 1 of D3(II), the second monomer feed was carried out drop-wise in order to control the temperature, whereas the experimental report of AP-II does not indicate that the temperature had been controlled by the feed rate of the monomers. Although the total time needed for the feed of the second monomer mixture may have been identical in both experiments, it is not clear from the wording in the report that the actual concentration of the monomers in the reaction mixtures had been identical in both experiments at all times.

4.1.4 In view of these differences, the experiment described by AP-II cannot be acknowledged as a true repetition of Example 32 of D3(II). Nor can the Board discern any further disclosure in this document which would clearly and unambiguously anticipate the subject-matter of Claim [1].

4.1.5 Consequently, the Board has no reason to come to a conclusion different in this respect from that in the decision under appeal. Therefore, Claim [1] meets the requirements of Article 54 EPC.

Problem and solution

4.2 According to its description, the patent in suit aims at the provision of aqueous polymer dispersions suitable for use as binder components of curable aqueous surface coating compositions (§ [0001]).

4.3 The parties and the Opposition Division had accepted D1(I) as closest state of the art. The Board has no reason to deviate therefrom.

4.3.1 Document D1(I) describes a blend of emulsion polymers useful as a film forming binder component in an aqueous coating composition not requiring the presence of volatile organic solvent coalescents (page 2, lines 1 and 2, 57 and 58), which cause environmental problems due to their evaporation into the atmosphere (page 2, lines 50 and 51). In order to achieve high hardness and high blocking resistance whilst maintaining a low MFT, the blend of the document comprises hard and soft polymers. On the one hand, it should contain a hard polymer having a T_g of preferably 25 to 65°C in order to provide the desired properties such as hardness and blocking resistance to the final coating film, and on the other hand, a soft polymer having a T_g preferably in the range of from 0 to 5°C (D1(I): page 4, lines 18 to 25). The ratio of the two polymers should be such that the soft polymer was the continuous phase and the hard polymer was the dispersed phase, so that the MFT of the blend would remain about equal to the MFT of the soft polymer (page 3, lines 50 to 56). Preferably the weight percentage of the hard polymer to soft polymer was in the range of from about 20 to 40 % by weight of the hard polymer and from about 80 to about 60 % by weight of the soft polymer (page 4, lines 1 and 2 and the examples). The T_g of a polymer determined the physical characteristics of a film formed from a coating composition containing the polymer and also the minimum temperature at which the coating can be applied to the substrate to form a film (MFT; page 2, lines 13 to 16).

According to Example 4 of the document, a minimum amount of hard phase is needed for the blocking resistance to begin to improve.

4.3.2 In view of the above findings, the control examples without MFM, as provided in the patent in suit and in the additional experimental reports, can be considered as control examples validly representing D1(I).

4.3.3 In the decision under appeal, the technical problem to be solved with regard to D1(I) was seen in the provision of binders for coating compositions which allow to obtain coatings having an improved blocking resistance, hardness and chemical resistance whilst maintaining a low MFT (section III(3), above).

The solution to this problem was, according to Claim [1], an aqueous dispersion containing particles on the basis of two polymers of different T_g (polymers A and B as defined in the claim) and a MFM which was selected from epoxy (meth)acrylates, urethane (meth)acrylates, multifunctional (meth)acrylate monomers and amine-(meth)acrylate adducts.

In the [examples], only TMPTA was used as the MFM.

4.3.4 With regard to the limited scope of the [examples], Appellant I asserted, however, that the above technical problem would not be solved in the whole ambit of Claim [1]. In order to support this objection, it filed an experimental report, wherein the blocking resistance of compositions containing polymers A and B with and without an MFM had been determined. In their series of experiments, two MFA compounds had been used at different concentrations, *viz.* TMPTA as used in the [examples] and another MFA as described in D11(I) (section VII, above), which also complied with the definition of the MFM in Claim [1].

Whilst in the examples with TMPTA, an improvement of the blocking resistance had been achieved, thus confirming the results in the [patent], the results of the other examples, ie the blocking resistance of those compositions containing the other MFA, had even been inferior to the control example without MFA.

4.3.5 The Respondent tried to invalidate these results by comparing with each other the results (reported values) of the blocking assessments of all the control examples without MFM, filed by both parties. Since these values were different and, moreover, not all marginal conditions for the blocking tests had, in its opinion, been given in the latest experimental report of AP-I (of 19 December 2005; section VII, X(1) and XIII(7), above), the Respondent concluded that this experimental report was of no value.

4.3.6 However, a close view on the details in this experimental report of AP-I shows, in the Board's view, that all measuring conditions have been made available at least by reference to D12(I). Thus, in No. 4.1 of ASTM D2793-69, reference is made to standard hardboard panels and to the film coated thereon and, in No. 5.1, the storage conditions of the coated panels including the temperature are described. The further details of the determination of the blocking behaviour are given in the report itself. By contrast, the conditions used in the patent in suit are not so clear. Thus, whilst in § [0046] and § [0047], reference is made to D13(I) and to a "sealed card" in connection with the blocking resistance, the blocking measurements were carried out, according to the specific description of the examples in § [0060], like the measurements of the KH and of the xylene swab, using clear films drawn onto glass panels.

Apart from the influence of any differences in the pressures and the temperatures applied to the stacks of coated panels and irrespective of whether sealed card or glass had been used in the patent in suit and in the further experiments of the Respondent, the use of the different substrate (standard hardboard) in the experimental report of 19 December 2005 explains logically the differences in the blocking assessment results obtained in the different series of experiments for the control examples without MFM.

4.3.7 In view of these differences, the Board has no reason not to consider the latter results as relevant and also conclusive.

Having regard to the above experimental report, the Board acknowledges that the asserted improvement was, indeed, achieved by a combination of polymers A and B as defined in Claim [1] *with TMPTA*. However, the report also demonstrates convincingly that the combination of the same polymers A and B with SR9035 (with a T_g of 2°C as reported in (D11(I)), ie another MFM within the definition of Claim [1], does not provide the claimed improvement in blocking resistance, but yields results even poorer than the control example without MFM.

Thus, these findings additionally demonstrate that, as already argued by AP-I (section VII, above), the synergism acknowledged in the decision under appeal (section III(4), above) cannot be acknowledged for the whole breadth of Claim [1].

4.3.8 Consequently, the technical problem cannot be maintained as suggested in section 4.3.3, above, but it has to be reformulated in a less ambitious way, ie as being directed to compositions providing coatings having similar properties as those known from D1(I) (cf. section XIII(8), above).

Inventive step

4.4 It remains to be decided whether the claimed solution found can be derived in an obvious way from the cited documents.

4.4.1 As shown in section 4.3.1, above, aqueous coating compositions are known from D1(I). The document shows furthermore, that volatile CA compounds can be dispensed with by using a combination of two polymers within the definition of polymers A and B in weight ratios in which the soft polymer forms the continuous phase with the hard polymer, which is responsible for the physical properties such as hardness and blocking resistance, being dispersed therein, because the MFT of the coating composition remains essentially that of the soft polymer.

However, it does not suggest to use an MFM.

4.4.2 Further ways of avoiding volatile organic compounds from coating compositions have been known from other documents, such as eg D3(I). This document suggests to add to water-based UV-curable coating compositions a MFM/MFA (section III(4), above, second paragraph), and it also describes the influence of such a compound on the properties of the final cured film. In view of these facts, the Board has no reason, in view of the arguments and evidence provided by the parties during the appeal proceedings, to deviate from the finding in the decision under appeal (section III(4), above), that the skilled person would have expected from the combination of the teachings of D1(I) and D3(I) that hardness and chemical resistance could be increased by addition of an MFA (eg TMPTA), whilst maintaining a similar block resistance already achieved in D1(I).

4.4.3 Furthermore, the advantages of a combination of water-based systems and UV/EB curing technologies, which allow the formulation of aqueous polymer emulsions having a low MFT and good film build-up, have been described in D9(I). This document considers the different ways of achieving applicability of coating compositions at low temperatures, namely by using emulsions of soft polymers (having a low T_g and MFT, two parameters closely connected; D9(I): page 571, middle column, paragraph 2) or by adding a CA to lower the MFT and to temporarily plasticize the polymer (loc. cit.

right column). However, the hitherto used conventional CA compounds were undesired volatile organic compounds (cf. section 4.3.1 and 4.4.1, above). In order to avoid the disadvantages of such compounds, D9(I) recommends the use of a reactive CA compound, such as TMPTA.

In particular, as argued by AP-I, several passages in D9(I) (sections V(5), XI and XIII(5), above) show that TMPTA, whilst acting as a CA and temporary plasticizer during the application of the dispersion, need not be removed after the film formation, as is necessary when using conventional CA compounds, because TMPTA can be homopolymerised in the curing step and because "it doesn't induce residual plasticization due to its hardness". Rather, explicit mention is made of a further "striking advantage of the system" residing in "the increase of resistance to blocking tendency".

4.4.4 The Respondent has expressed its opinion that the skilled person would not consider a transfer of the disclosure of D9(I) to the system of D1(I) (section XIII(6), above). However, in view of the fact that, D1(I), D3(I) and D9(I) deal with the same type of aqueous coating systems, of the dependence of the properties of the coatings obtained from such systems from their composition and of the findings in section 4.3.7 and 4.3.8, above, the Board takes the view that the person skilled in the art could consider any one of D3(I) and D9(I), when wishing to modify a coating system of the type as known from D1(I).

4.4.5 Consequently, the Board takes the view that both D9(I) and D3(I) provide the teaching that the compositions of D1(I) can be modified by addition of a reactive CA compound (eg TMPTA) and that by doing so coatings can be obtained the properties of which are at least similar to those of the coatings of D1(I).

4.4.6 In summary, the Board has come to the conclusion that the subject-matter of Claim [1] is not based on an inventive step in view of the teachings of D1(I) and D3(I) and/or D9(I).

Since a decision can only be made on a request as a whole, the Main Request is therefore refused.

The Auxiliary Requests filed by the Respondent

5. Before considering individual auxiliary requests, some general remarks to the numerous auxiliary requests filed during the opposition and appeal proceedings appear necessary.

5.1 In the course of the opposition proceedings, the Patent Proprietor filed, with the letter dated 6 February 2004 (section II, above), in addition to the claims as granted (Main Request), the sets of claims of thirty-two new auxiliary requests. Auxiliary Requests 1 to 7 and 21 to 31 comprised claims to the aqueous polymer dispersions and to a paint comprising such a composition. Auxiliary Requests 8 to 12 and 32 related to the paint only, whilst Auxiliary Requests 13 to 20 contained only use claims.

5.2 This situation remained essentially the same in the new set of thirty-three auxiliary requests, which were filed with the letter of 7 June 2005 during the appeal procedure to replace the above previous requests (sections VI(4) and 5.1, above). The new set of auxiliary requests differed from the previous requests, essentially in that it contained an additional Auxiliary Request 4 inserted between the previous Auxiliary Requests 3 and 4 and the adaptation of the numbering of the subsequent requests to this fact.

5.3 With the letter/fax of 22 October 2007, ie two days before the oral proceedings, a new set of thirty-four auxiliary requests was submitted, in which the sequence of requests was changed to a large extent (section XII, above). Moreover, new Auxiliary Request 9 was filed therewith for the first time (see the table in section XII, above).

5.4 This sequence of auxiliary requests has then been further modified during the oral proceedings on 24 October 2007 by replacing its Auxiliary Request 1 by a new one (section XIII(12), above).

Auxiliary Requests 1 and 9

6. These two requests are dealt with herein together, because they have one feature in common, ie the requirement that the MFM (Component C) be emulsified (a feature neither contained in any other set of claims which had been previously or has still been on file, nor discussed previously in connection with the claims), and because both requests were submitted at an extremely late stage of the proceedings (sections XII, XIII(10), XIII(12), 5.3 and 5.4, above).

6.1 Thus, the letter/fax of 22 October 2007 containing new Auxiliary Request 9 within a sequence of 35 requests was received by the Office on the same date in the late afternoon at 17:27, less than 40 hours before the oral proceedings, and it was handed over to AP-I, who had not got it before, only in the morning of 24 October 2007 just before the start of the hearing.

Auxiliary Request 1 was filed at the hearing, after the decision of the Main Request had been given.

In view of these filing dates, the Auxiliary Request 9 will be dealt with before Auxiliary Request 1.

6.1.1 It is established jurisprudence that amended claims should be filed in appeal proceedings in good time in order to enable the Board and the other parties to deal properly with the new claims (cf. the "Case Law of the Boards of Appeal of the European Patent Office", 5th edition, 2006, chapters VII.D.14.1 and VII.D.14.2).

6.1.2 It has to be assumed that the filing of the additional Auxiliary Request 9 (and of the experimental data as referred to in section VIII, above) had been triggered by the latest previous letter of the Appellants dealing with the substance of the subject-matter under consideration, ie the letter of AP-I dated 19 December 2005 including experiments with a MFA other than TMPTA, *viz.* SR9035 as characterised in D11(I) (section VII, above). Subsequently, it took the Respondent more than 21 months before it filed Auxiliary Request 9, even after two further letters of 31 July and 4 September 2007 containing an additional experimental report and its supplement, respectively, and after the comments on these experiments by AP-I in its letter dated 24 August 2007 (sections VIII, IX and X, above).

6.2 In view of this sequence of events, the Board could not accept that Auxiliary Request 9 has been filed in good time for consideration by the other parties and by the Board (section XIII(12), above).

6.3 Nor could the Board accept that it had not been possible to file new Auxiliary Request 1 before the announcement of the refusal of the Main Request, as asserted by the Respondent. Even when disregarding the filing of numerous auxiliary requests before the submission of the above experimental report of AP-I (sections VII and 6.1.2, above), the filing of Auxiliary Request 9 shows that the Respondent had been aware of the possible failure of its Main Request.

6.4 Moreover, the repeated filing of more than thirty auxiliary requests and the submission of further experimental data demonstrate that the Respondent had had ample time and opportunities to defend its patent in the best way possible by establishing a clear sequence of backup positions (lines of retreat) and by submitting adequate sets of claims in order to overcome the various objections raised by the Appellants.

6.5 In these circumstances, the Board came to the conclusion at the oral proceedings on 24 October 2007, not to admit Auxiliary Requests 1 or 9 to these appeal proceedings (Article 10b(1) and (3) RPBA).

Auxiliary Request 10

7. The claims of Auxiliary Request 10 (section XIII(13), above) correspond to those of Auxiliary Request 22 of

7 July 2005 and of Auxiliary Request 21 of 6 February 2004, respectively. Therefore, this request is not considered as having been late-filed.

7.1 The amendments in Claim 1, which require the presence of a certain amount of a specific functional comonomer in both polymers A and B, clearly limit the scope of the claim in comparison with Claim [1], so that no objections under Article 123(3) EPC arise.

7.2 Furthermore, the amendments of the claims are based on *page 1, lines 17 to 31*, in particular, *lines 24 and 28*, and *page 3, line 29 to page 4, line 11*, thereby taking into account the correction of the error addressed in the letter dated 6 February 2004 (item I).

Hence, no objections arise under Article 123(2) EPC either.

7.3 The Appellants raised the question of whether Claim 1 clearly and unambiguously required that at least one functional copolymerisable monomer selected among the monomers with acetoacetyl or amine groups was present as a mandatory constituent in both polymer components A and B (section XIII(13), above).

In this respect, the Board takes the view that the last passage in Claim 1 (shown in section XIII(13), above, in bold type) clearly addresses the composition of **each** constituent polymer, irrespective of whether it falls within the definitions of polymer A or polymer B. Moreover, it requires that the functional monomers be present in the polymers in amounts not exceeding 15 parts by weight per 100 parts by weight.

Hence, the Board is satisfied that the claims comply with Article 84 EPC.

Novelty

7.4 Nor do any objections arise with regard to novelty of the subject-matter of this request, the facts and findings in sections 4.1 to 4.1.5, above, are *a fortiori* valid for the further limited subject-matter of the present claims.

Problem and solution

7.5 New Claim 1 requires the presence of two polymer components A and B, each having been functionalised by means of the additional copolymerisable monomers defined at the end of the claim, and the presence of component (C), ie a MFM.

7.6 With regard to this new request, the Respondent asserted that the technical problem to be solved with respect to D1(I) could be seen in the provision of binders for coating compositions having improved blocking resistance.

7.7 Moreover, the Respondent argued that it had provided convincing evidence that this problem was indeed solved by the subject-matter of Claim 1. To this end, it referred to its additional experiments (sections VIII and X, above), which included the use of two MFA compounds, ie TMPTA (T_g = 63°C, which is within the temperature range of the hard polymer B) and SR-494 (T_g = 2°C, ie within the temperature range of the soft polymer A; see D8(I)), in combination with polymers A and B, each containing the functional groups derived from the comonomers defined at the end of Claim 1.

7.8 These experimental results have not been refuted by the Appellants. Despite an announcement of counter-experiments (see section IX, above), no experimental data have been received, which could draw the above results into question. However, the burden of proof in this respect would have been on the opposing Appellants.

7.9 As demonstrated by the evaluations of Compositions 2 to 4 in each of Tables 2 and 3 of the Respondent's supplemented report, the compositions according to Claim 1 show improved blocking resistance not only with respect to the control examples (as represented by Composition 1 in Tables 1 and 5, respectively, of the above report), which correspond to comparative Example [2] and to D1(I) (cf. section 4.3.2, above), but also with respect to the other compositions which comprised either polymers containing the functional monomers, but no MFM (Composition 1 in Tables 2 and 3, respectively) or which comprised identical amounts of the respective MFM but only polymers free of functional groups (Compositions 2 to 4 in each of Tables 1 and 5).

7.10 Therefore, the Board is satisfied that the above technical problem of providing a coating composition suitable for the preparation coatings having improved blocking resistance in comparison with the closest state of the art, ie D1(I) has actually been solved by the subject-matter of Claim 1.

Inventive step

7.11 It remains to be decided whether the claimed solution of the above problem can be derived in an obvious way from the cited documents.

7.11.1 Although in D1(I) reference has been made to the optional incorporation of a functional comonomer, eg ureido functional monomers into the polymers (page 4, lines 39 to 41), the document does not indicate or suggest that the above problem might be solved by a solution within the ambit of Claim 1. Rather, D1(I) does not provide any indication that this modification of the polymers might provide advantages with regard to the blocking resistance. Moreover, Composition 1 in each of Tables 2 and 3 in the Respondent's latest experimental report shows that such a modification of the two polymers does not improve the blocking resistance in comparison with Composition 1 of either Tables 1 or 5 (cf. section 7.9, above). Nor does "Control^5" in Table 5 of D1(I), describing a composition of two polymers, one of which had been functionalised by ureido monomer, contradict this finding, because it cannot be directly compared with any one of the other examples in D1(I) due to completely different compositions of the polymers used, and because no T_g data of these polymers are available in the document.

Consequently, D1(I) itself does not provide any incentive to solve the above technical problem by means of a composition of the aqueous polymer dispersion as defined in Claim 1.

7.11.2 Nor can D3(I), which does not refer to an improvement of blocking resistance, provide an incentive to achieve such an improvement by means of an aqueous polymer composition (as defined in Claim 1) comprising the specific polymers A and B both containing acetoacetyl or amine functional groups and (C) a MFM.

7.11.3 As far as Document D9(I) considers the possibility to use polymers having reactive groups, it refers only to an emulsion which "bears free double bonds which are also able to copolymerise with the reactive coalescing agent." (D9(I): page 572, paragraph 4).

7.11.4 From these considerations it is evident to the Board, that even when reading D1(I), D3(I) and D9(I) together, there is no incentive to solve the above technical problem by modifying the teaching of D1(I) so as to arrive at something within the scope of Claim 1, ie at an aqueous composition containing polymer particles of the polymers A and B and Component (C), all as required by the definitions in Claim 1.

7.11.5 Therefore, the subject-matter of Claim 1 is also based on an inventive step.

7.12 By the same token, the above findings are also valid for the elaborations in the remaining Claims 2 to 5, all being appendant or related to Claim 1 (section XIII(13), above).

7.13 Consequently, the Board has come to the conclusion that the claims of Auxiliary Request 10 comply with the requirements of the EPC.

8. In view of these findings, there is no need further to consider the further auxiliary requests of the Respondent.

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 to 5 of the Auxiliary Request 10 filed with letter dated 22 October 2007 and after any necessary consequential amendment of the description.

The Registrar: The Chairman:

E. Görgmaier C. Idez