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**Datasheet for the decision
of 20 November 2015**

Case Number: T 0568/11 - 3.3.03

Application Number: 05716225.7

Publication Number: 1732962

IPC: C08F265/02, C08F257/02,
C09D151/00, C08F2/00

Language of the proceedings: EN

Title of invention:
AQUEOUS VINYL OLIGOMER AND VINYL POLYMER COMPOSITIONS

Patent Proprietor:
DSM IP Assets B.V.

Opponent:
BASF SE

Headword:

Relevant legal provisions:
EPC Art. 83, 54, 56
RPBA Art. 13(1)

Keyword:

Sufficiency of disclosure - (yes)

Novelty -

No combined reading of example with additional passage of the prior art

Late filed novelty objection - not admitted

Comparative tests not suitable to demonstrate alleged improvement - lack of inventive step (all requests)

Decisions cited:

T 0939/92, T 0332/87, T 0197/86

Catchword:



Beschwerdekammern
Boards of Appeal
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Case Number: T 0568/11 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 20 November 2015

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 26 January 2011
rejecting the opposition filed against European
patent No. 1732962 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman O. Dury
Members: F. Rousseau
R. Cramer

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division posted on 26 January 2011 rejecting the opposition against European patent No. 1 732 962.

II. Claim 1 as granted reads as follows:

"1. An aqueous composition comprising:

i) at least a crosslinkable vinyl oligomer A with a weight average molecular weight in the range of from 1000 to 80,000 Daltons obtained by bulk polymerisation of:

- (a) 5 to 45 wt% of vinyl monomers bearing ionic or potentially ionic water-dispersing groups;
- (b) 0 to 30 wt% of vinyl monomers bearing non-ionic water-dispersing groups;
- (c) 2 to 25 wt% of vinyl monomers bearing crosslinkable groups;
- (d) 0 to 40 wt% of α -methyl styrene;
- (e) 10 to 93 wt% of vinyl monomers not in (a), (b), (c) or (d);

where (a) + (b) + (c) + (d) + (e) = 100%; and

ii) at least a vinyl polymer B with a weight average molecular weight \geq 5000 Daltons, obtained by polymerisation in the presence of vinyl oligomer A of:

- (f) 0 to 5 wt% of vinyl monomers bearing ionic or potentially ionic water-dispersing groups;
- (g) 0 to 20 wt% of vinyl monomers bearing non-ionic water-dispersing groups;

- (h) 0 to 15 wt% of vinyl monomers bearing crosslinkable groups;
- (i) 60 to 100 wt% of vinyl monomers not in (f), (g) or (h);

where (f) + (g) + (h) + (i) = 100%;

where the ratio of vinyl oligomer A to vinyl polymer B is in the range of from 5:95 to 95:5; where polymer B is more hydrophobic than vinyl oligomer A;

where the weight average molecular weight of vinyl polymer B is more than the weight average molecular weight of vinyl oligomer A;

iii) 0 to 20 wt% of co-solvent; and

iv) 30 to 90 wt% of water;

where i) + ii) + iii) + iv) = 100%."

III. The patent had been opposed in its entirety on the grounds that it lacked sufficiency of disclosure (Article 100(b) EPC), novelty and inventive step (Article 100(a) EPC). The following documents had been cited during the first instance proceedings:

D1: EP-A-0 989 163

D3: WO 95/29944

D5: US-A-4 151 143

D6: M. P. Stevens, "Polymer Chemistry: An Introduction", Oxford University Press, 3rd edition, 1999, pp 173-175

D7: Declaration of Y. Smak of 11 November 2010

IV. According to the reasons of the decision, the skilled person was able to prepare the compositions being claimed taking into account the information contained in the patent specification and the common general knowledge. The objection of lack of sufficiency was considered as amounting at most to an objection for lack of clarity under Article 84 EPC which was not a ground for opposition. Novelty was acknowledged, in particular over D1. As to inventive step, both D1 and D3 were considered as closest prior art, from which the compositions as defined in claim 1 of the patent in suit were distinguished in that the vinyl oligomer A was obtained by bulk polymerisation. The objective problem solved over D1 or D3 was to provide aqueous compositions which lead to coatings having improved chemical resistance and inks having improved printability, which effects were shown by the examples of the patent in suit. None of the cited prior art documents suggested to use bulk polymerisation instead of emulsion polymerization for the preparation of the vinyl oligomer in order to solve said problem. An inventive step was therefore acknowledged.

V. The appellant (opponent) submitted its statement of grounds of appeal with letter of 1 June 2011.

VI. The rejoinder of the respondent (patent proprietor) was submitted with letter of 11 October 2011.

VII. With letter of 21 June 2013, the appellant submitted an additional objection of lack of novelty in view of following documents submitted with that letter:

D11: EP-A-0 574 803

D12: Experimental Report 2

VIII. With letter of 25 September 2015, the respondent submitted auxiliary requests I, II and III. Compared to claim 1 as granted, claims 1 of auxiliary requests I to III contained the following additional wordings, inserted at the end of the claim, i.e. after "... where i) + ii) + iii) + iv) = 100%".

Auxiliary request I

"; wherein the composition additionally comprises at least one crosslinking agent"

Auxiliary request II

"; wherein the composition additionally comprises at least one crosslinking agent; and wherein the crosslinkable groups include keto, aldehyde and/or acetoacetoxy carbonyl groups"

Auxiliary request III

"; wherein the composition additionally comprises at least one crosslinking agent; and wherein the vinyl monomers bearing crosslinkable groups are acetoacetoxy ethyl methacrylate (AAEM) and/or diacetone acrylamide (DAAM)".

IX. A communication dated 26 October 2015 and sent in advance by telefax on 21 October 2015 was issued by the Board in preparation of the oral proceedings.

X. The oral proceedings took place on 20 November 2015 at the end of which the decision of the Board was announced.

XI. The appellant's submissions, as far as relevant for the decision, can be summarised as follows:

Main Request

- a) Since the composition according to claim 1 was defined in very broad terms, in particular with respect to the functionality of the mandatory components (a), (c) and (e), the skilled person was faced with the task to decide whether monomers fulfilled more than one of the three functions defined for (a), (c), (e) and in that case to determine which proportion of said monomers was to be subsumed under (a), (c) and (e). Since the description did not furnish the necessary details in order to support the skilled person in that respect, the latter was unable to decide if an embodiment fell within the ambit of claim 1. For that reason, the subject-matter claimed lacked sufficiency of disclosure.

- b) Both D1 and D11 disclosed the claimed subject-matter. The aqueous compositions of examples 11 and 12 of D1 differed from the aqueous composition according to claim 1 only in that the first polymer was prepared by emulsion polymerisation and not by bulk polymerisation. However, in view of the teaching of paragraph [16] in D1, the person skilled in the art would replace emulsion polymerisation with bulk polymerisation, as there were no reasons that would have prevented the skilled person from combining the disclosure of those examples with said passage of the description. In this context reference was made to T 332/87. As to D11, copolymer A was made of styrene and acrylic acid and fulfilled the

definition of vinyl oligomer A according to claim 1 of the patent in suit when considering that styrene was a monomer (e) and acrylic acid could be both monomer (a) and (c) according to granted claim 1. D11 could not have been submitted earlier since it had been brought to the appellant's attention only recently. D11 was however of high relevance for the patentability of the subject-matter of the patent in suit, in particular in combination with experimental report D12 showing the weight average molecular weight of vinyl polymer B used in D11. Therefore, both documents should be admitted to the proceedings.

- c) As to inventive step, the closest state of the art was D1. The subject-matter of the granted patent only differed from that of D1 in the fact that vinyl oligomer A was obtained by bulk polymerisation instead of emulsion polymerisation. Contrary to the patent proprietor's opinion, comparative examples 7, 9, 11 and examples 6, 8, 10 could not be relied on to show any technical effect arising from this distinguishing feature, since the compositions compared did not only differ in the feature distinguishing the claimed subject-matter from the closest prior art and the additional differences between the compositions compared also influenced the properties of the resulting coating or ink compositions. Hence, the technical effects identified by the respondent could not be seen as being linked to bulk polymerisation only. Therefore, the objective technical problem could only be formulated as to provide an alternative aqueous composition. D1 suggested in paragraph [16] that the first oligomer could be prepared by bulk polymerisation

as well. D5 related to a teaching similar to D1 and disclosed an aqueous coating composition prepared *inter alia* by polymerisation of water soluble and water insoluble monomers in the presence of a carboxyl group-containing polymer, the latter being prepared by bulk polymerisation. Hence, starting from D1 and in the light of D1 alone or D5, the subject-matter defined in claim 1 was obvious.

- d) No additional comments were presented with respect to inventive step of auxiliary requests I to III.

XII. The respondent's submissions, as far as relevant for the decision, can be summarised as follows:

- a) The appellant's objections for lack of sufficiency of disclosure amounted at most to an unallowable objection for lack of clarity.
- b) Bulk polymerisation and emulsion polymerisation were not interchangeable techniques, as indicated in D6 or D7. Hence, the skilled person would not read examples 11 and 12 of D1 in the light of paragraph [16] of that document. Novelty over D1 should therefore be acknowledged. D11 and D12 were late filed and *prima facie* not relevant to the subject-matter defined in claim 1 of the patent in suit as the passages relied on by the appellant did not disclose the use of a cross-linker for producing vinyl oligomer A. Therefore, D11 and D12, whereby the latter merely concerned the molecular weight of the vinyl polymer B of D11, should not be admitted into the proceedings.

- c) As to inventive step, the closest state of the art was D3. The objective problem to solve was to achieve improved chemical resistance for coatings as well as improved printability for inks. This problem was solved by providing an aqueous composition in which the vinyl oligomer was obtained by bulk polymerisation. Comparative examples 7, 9 and 11 when compared with examples 6, 8 and 10 respectively showed that bulk polymerisation leads to improved chemical resistance (table 5) and printability (table 6) and hence that the problem was successfully solved.
- d) In accordance with T 197/86, the nature of the comparison with the closest state of the art was such that the effect was convincingly shown to have its origin in the distinguishing feature of the invention. In that respect, it had been necessary to modify the elements of comparison so that they differed only by such distinguishing feature. More specifically, the examples and comparative examples were as close as possible considering that both emulsion and bulk polymerisation could not be carried out under the same conditions, and were thus fairly comparable. α -methyl styrene was deliberately omitted in the emulsion version of V02 for stability purposes. The presence of a neutralisation step was implicit in the formation of V02 and V06 since examples 6, 8 and 10 started from an alkaline solution thereof. The presence of a chain transfer agent was necessary in emulsion polymerisation in order to regulate the resulting polymer's molecular weight. The appellant provided no element of proof showing that those differences would have an impact on the composition's properties. This was true also for the other

differences identified by the appellant, which were so minimal that they could in any case not contribute to the difference of properties shown in tables 5 and 6.

- e) As evidenced by D6 and D7, bulk polymerisation and emulsion polymerisation were not interchangeable. The skilled person would refrain from using bulk polymerisation considering that this technique was cumbersome, provided more disadvantages than benefits and led to polymers exhibiting different properties (D6). In addition, that technique involved totally different reaction conditions (D7). The skilled person wishing to solve the posed problem would not consult D5 which related to surfactant-free polymer emulsion coatings and if so, he would not reasonably expect that it would successfully solve the posed problem.

- f) The problem to be solved would be the same when starting from D1 as closest state of the art. Paragraph [16] of D1 had to be read in the light of claim 1 of D1 only. Hence, should the skilled person start from this document, he would not apply the teaching of paragraph [16] to examples 11 and 12 since they constituted only a specific teaching of the subject-matter defined in claim 1 of D1. Therefore, the subject-matter as defined in claim 1 of the main request was not obvious.

- g) As regards inventive step, the same considerations applied to auxiliary requests I to III.

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

XIV. The respondent requested to dismiss the appeal or alternatively, that the decision under appeal be set aside and the patent be maintained on the basis of any of auxiliary requests I to III submitted with letter of 25 September 2015.

Reasons for the Decision

Main request

1. Sufficiency of disclosure
 - 1.1 The question to be answered in respect of sufficiency of disclosure is whether the patent in suit provides sufficient information to enable the skilled person to carry out the invention as defined in claim 1 taking into account common general knowledge, i.e. to prepare the compositions being claimed.
 - 1.2 The appellant's objection of lack of sufficiency refers to the situation described in paragraph [18] of the patent in suit where a functional group of a vinyl monomer may perform more than one of the functions defined in operative claim 1, as is the case for (meth)acrylic which is usually used as a water dispersing monomer according to definition (a), but may act as a cross-linkable monomer according to definition (c). As indicated by the appellant, this objection concerns the difficulty to decide in the above mentioned situation whether a specific composition can be considered to fall within the ambit of claim 1, as it would be difficult to determine which proportion of a monomer having both functions should be attributed to the amounts defined in claim 1 for monomers (a) and (c). This objection does not, however, refer to the ability

of the skilled person to prepare such compositions. The patent in suit provides with paragraphs [17] to [18] and [20] to [24] numerous examples of monomers encompassed by the definitions of groups (a) to (h), including those meeting the functional definitions of monomers (a) to (c) and (g) to (h). Moreover, the examples and paragraphs [49] to [59] of the patent in suit give information on how to prepare compositions made with those monomers, which obviously does not depend on whether a specific monomer should be attributed one or both labels (a) and (c), respectively (f) or (h). It was also not disputed that the skilled person would know how to obtain a polymer B and an oligomer A meeting the molecular weight requirements of claim 1, polymer B being more hydrophobic than vinyl oligomer A. Consequently, the appellant's objection of lack of sufficiency fails to convince and may only be seen as an objection for lack of clarity under Article 84 EPC. This objection, however, cannot be considered with respect to the claims of the present main request corresponding to the claims as granted.

2. Novelty

2.1 The appellant raised a novelty objection based on examples 11 and 12 of D1, arguing that those examples would be read in the light of paragraph [16] of that document, the synthesis of the first polymer by emulsion polymerisation being replaced by a synthesis by bulk polymerisation.

2.1.1 D1 relates to an aqueous crosslinkable polymer composition comprising *inter alia* a first polymer bearing acid groups and being water-soluble, and a second polymer, water-insoluble and comprising carbonyl-

functional groups, obtainable by emulsion polymerization in the presence of the first polymer (claim 1).

In example 11 the first polymer is prepared by emulsion polymerisation of methacrylic acid, methyl methacrylate, diacetone acrylamide, butyl acrylate and styrene (Table XIV, page 9). The hydrophobic second polymer is prepared by emulsion polymerisation of styrene, 2-ethylhexyl acrylate, methyl methacrylate, methacrylic acid, Nourycryl® MA-123 (a 50% solution in methylmethacrylate of ethylene urea ethylmethacrylate, see paragraph [34]), and diacetone acrylamide (a vinyl monomer bearing a cross-linkable group) in the presence of the first polymer to form an aqueous composition (Table XV; paragraphs [49]-[54]). Subsequently, a cross-linker agent which is adipic acid bishydrazide (ADH) is added. In example 12, a similar composition is prepared.

It was not disputed by the parties that the disclosure of examples 11 and 12 corresponds to the disclosure of an aqueous composition according to operative claim 1, except that oligomer A (the first polymer in examples 11 and 12) is obtained by bulk polymerization and not emulsion polymerization. The appellant also did not dispute that the disclosure of those examples *per se* would not be novelty destroying, hence implicitly agreed that bulk polymerization would lead to oligomers having a different structure than those obtained with emulsion polymerization, as indicated in D7 (point b).

Hence, examples 11 and 12 *per se* fail to disclose a composition in accordance with operative claim 1.

2.1.2 The Board agrees with the appellant that according to the established case law of the Boards of Appeal

regarding the examination of novelty, the teaching of a document is not confined to the detailed information given in the examples, but embraces the whole disclosure of that document (see decision T 332/87, point 2.2 of the reasons). Nevertheless, the general principle consistently applied by the Boards of Appeal for concluding lack of novelty is that there must be a direct and unambiguous disclosure in the state of the art which inevitably leads the skilled person to subject-matter falling within the scope of what is claimed.

- 2.1.3 However, there is no reason for the skilled person to read either example 11 or 12 in combination with paragraph [16] of the description. In particular, he would not seek any missing information in the general description with respect to the polymerisation technique to be used for producing the first polymer described in either example 11 or 12, since this information is already specified with those examples.
- 2.1.4 In addition, there is no indication in D1 that the examples of that document, in particular examples 11 and 12, should be repeated with bulk polymerization for preparing the first polymer. Paragraph [16] of D1 constitutes a general indication concerning the preparation of the first polymer, including bulk-polymerisation or emulsion polymerisation, which is merely to be read in the most general context of the invention disclosed in D1, i.e. claim 1 of that document which does not contain any restriction with regard to the preparation method to be employed for the synthesis of the first polymer.
- 2.1.5 In the Board's judgement, the skilled person derives from examples 11 and 12 nothing more than the bare

disclosure of the specific characteristics of these coating compositions, namely the combination of particular first and second polymers, the first polymer being obtained by emulsion polymerisation. The modification of examples 11 and 12 by the appellant can thus only be seen as the result of an *ex post facto* interpretation of document D1, i.e. made with the knowledge of the invention in mind and with the aim of reconstructing on purpose the claimed composition. For this reason, the appellant's objection that claim 1 lacks novelty over D1 must be rejected.

2.2 Novelty was also objected over D11 in the light of the experimental report D12. Considering that said objection was not raised in the statement setting out the grounds of appeal, but only after the respondent's rejoinder, the admissibility into the proceedings of this new objection is accordingly pursuant to Article 13(1) RPBA at the Board's discretion.

2.2.1 The objection is based on copolymer A of D11 made of styrene and acrylic acid which according to the appellant fulfils the definition of vinyl oligomer A according to feature i) of operative claim 1. However, according to a normal, technically sensible reading of claim 1 of the patent in suit the use of specific amounts for the three monomers (a), (c) and (e) defined in claim 1 implicitly means that those monomers are distinct. Oligomer A should thus at least comprise three different monomer units. That reading of claim 1 is not contradicted by the specification. In particular, the passage in paragraph [23] (lines 52-55) stating that the functional group imparting crosslinkability could include a carboxylic acid does not indicate that the monomers bearing such groups are also of the type providing water-dispersibility, and if it were the case

that this monomer should be subsumed at the same time both under (a) and (c).

2.2.2 Therefore D11 cannot be novelty destroying for the subject-matter defined in claim 1 of the patent in suit as it does not disclose vinyl oligomer A. There is therefore no need to consider D12 which aims at providing an indication of the molecular weight of the compounds obtained in D11. In these circumstances the Board sees no reason why the objection for lack of novelty based on D11 and D12 should be admitted into the proceedings (Article 13(1) RPBA).

2.3 In view of the above, the claimed subject-matter complies with Article 54 EPC.

3. Inventive step

3.1 Closest prior art

3.1.1 The parties were in dispute as to whether D1 or D3 constitutes the most appropriate starting point for assessing inventive step. The closest prior art for the purpose of objectively assessing inventive step is generally that which corresponds to a purpose or effect similar to that of the invention and requiring the minimum of structural and functional modifications (Case Law of the Boards of Appeal of the EPO, 7th edition 2013, I.D.3.1).

3.1.2 The patent in suit is directed to aqueous compositions to be applied on a variety of substrates including metal and glass (paragraph [66]) and which can be used as a coating composition, printing ink and/or an overprint lacquer (paragraph [67]). The patent in suit seeks to provide aqueous compositions having improved homogeneity

between hydrophilic and hydrophobic monomers, improved reversibility and where the mechanical and physical properties such as adhesion, ability to cross-link, minimum film forming temperatures, hardness, blocking and chemical resistance are easily tailorable (paragraph [7]).

- 3.1.3 D1 pertains to an aqueous cross-linkable polymer composition for coatings which shows *inter alia* a high hardness and high chemical resistance after curing, said coating being applicable on various substrates such as metal (paragraphs [10] and [11]). In particular, the coatings prepared in examples 11 and 12 show good film formation when applied onto a metal substrate (paragraph [59]) or a glass substrate (paragraph [64]). As shown above with respect to novelty of the claimed subject-matter over D1, the composition of operative claim 1 differs from that of examples 11 or 12 of D1 in that vinyl oligomer A has a different morphology resulting from bulk-polymerisation, whereas the vinyl oligomers of D1 are obtained by emulsion polymerisation.
- 3.1.4 D3 relates to aqueous crosslinkable compositions useful for coatings and inks applicable on substrates such as metal, showing *inter alia* high hardness and low minimum film forming temperature, as well as good solvent and water resistance (page 1, lines 25-30, page 2, lines 29-32, page 4, lines 26-31 and page 15, lines 21-27). In particular, the coatings prepared in examples 1-3 show an excellent balance of low minimum film forming temperature, hardness, excellent water resistance and reasonable to excellent chemical resistance (page 26, line 19 to page 27, line 11). In examples 1 to 3, the coatings are made from an aqueous composition obtained by polymerising in emulsion methylmethacrylate, n-butylmethacrylate and diacetone

acrylamide, in the presence of an oligomer obtained by emulsion polymerisation of n-butylacrylate, methylmethacrylate, methacrylic acid and diacetone acrylamide. The aqueous compositions also contain adipic acid bishydrazide (ADH) as cross-linker (page 14, lines 22-25, and entry Nr. 25 in logsheets on pages 19, 21 and 25). Similar as for D1, it was not disputed by the parties that the composition according to claim 1 of the patent in suit differs only from the compositions prepared in examples 1-3 of D3 in that the oligomer A is prepared by bulk polymerisation instead of emulsion polymerization, e.g. that the morphology of oligomer A is such as being obtained by bulk polymerisation instead of emulsion polymerisation.

3.1.5 Consequently, having regard to the similitude of purposes underlying the inventions according to D1 and D3 and their same structural difference vis-à-vis the compositions according to operative claim 1, both D1 and D3 are considered as a suitable starting point for assessing inventive step.

3.2 Problem and solution

3.2.1 Having regard to the disclosure of either D1 or D3, the respondent submitted that the technical problem solved by the subject-matter of claim 1 of the patent in suit was the provision of aqueous compositions which lead to coatings having improved chemical resistance and inks having improved printability. That problem is meant to be solved by the use of a bulk polymerization for preparing the vinyl oligomer A instead of an emulsion polymerization.

3.2.2 As to whether evidence has been provided that the claimed subject-matter provides a successful solution to

the problem mentioned above, the respondent referred to three comparative tests of the patent in suit, namely comparisons between comparative examples 7, 9 and 11 vs. examples 6, 8 and 10, respectively (paragraphs [127]-[135]). According to the established case law of the Boards of Appeal, in the case where comparative tests are chosen to demonstrate an inventive step on the basis of an improved effect, the nature of the comparison with the closest state of the art must be such that the alleged advantage or effect is convincingly shown to have its origin in the feature distinguishing the invention from the closest state of the art, in the present case the change of morphology of vinyl oligomer A resulting from the use of bulk instead of emulsion polymerization.

3.2.3 The comparative tests submitted by the respondent can be analysed as follows:

- (a) The aqueous composition prepared in comparative example 7 differs *inter alia* from the one prepared in example 6 in that a vinyl oligomer (CV08) prepared by emulsion polymerisation is used instead of a vinyl oligomer (V06) prepared by bulk polymerisation. However, the other characteristics of the aqueous compositions compared cannot be considered to have been kept constant having regard to the use of 3-mercaptopropionic acid (a chain transfer agent, see paragraph [55]) and of large amounts of ammonia during preparation of CV08 (paragraph [74]). In respect of the chain transfer agent, the respondent did not dispute that the amount of hydrophilic groups in the oligomer would be modified consequently and its argument according to which such a compound had to be used in the emulsion polymerisation is not convincing since

there exist other means, less invasive, to regulate a polymer's molecular weight. As to ammonia, if it can be deduced that V06 has been neutralised since it is in alkaline form (two first lines of paragraph [86]), the nature of the base used for neutralisation is unknown. In addition, the step of emulsion polymerisation for producing the vinyl polymer B in the presence of the vinyl oligomer A is also different in comparative example 7 as the amount of solids content of the oligomer used (17.4% for V06 and 24.8% for CV08) and of the resultant composition (27.1% for example 6 versus 36.8% for comparative example 7) is not the same (paragraphs [86]-[90]).

- (b) The aqueous composition prepared in comparative example 9 differs *inter alia* from the one prepared in example 8 in that a vinyl oligomer (CV07) prepared by emulsion polymerisation is used instead of a vinyl oligomer (V02) prepared by bulk polymerisation. Those oligomers differ however also from each other in other aspects, first of all in the presence of ammonia during preparation of CV07 (paragraph [72]) and in the nature of the monomers in V02 and CV07, the latter lacking α -methyl styrene (Table 1 and paragraph [72]). In this respect, the respondent's argument according to which styrene had to be used instead of α -methyl styrene for CV07 since α -methyl styrene was not water-soluble is not persuasive as for instance solely styrene could instead have been used for both oligomers. In addition, the molecular weight M_w of the vinyl polymer B has been varied of a magnitude order of more than 5 (85000 kDa in comparative example 9 versus 15000 kDa in example 8) and the amount of solids content of the

resulting composition has not been kept constant (32.9% in comparative example 9 versus 41.8% in example 8; see paragraphs [92] and [95]).

- (c) The aqueous composition prepared in comparative example 11 differs *inter alia* from the one prepared in example 10 in that a vinyl oligomer (CVO8) prepared by emulsion polymerisation is used instead of a vinyl oligomer (VO6) prepared by bulk polymerisation. However, as shown in above point (i) other characteristics were not kept the same when preparing those oligomers. Moreover, the molecular weight Mw of the vinyl polymer B used in comparative example 11 and example 10 has not been kept constant but modified from a magnitude order of almost 3 (5000 kDa in comparative example 11 versus 1800 kDa in example 10, paragraphs [97] and [100]) and the ink formulation of comparative example 11 contains a thickener "Rheocoat 35" which is not contained in the ink formulation of example 10 (paragraphs [134] and [135]).

3.2.4 Summing up, the comparative tests relied on by the respondent are not based on compositions which differ only in the feature meant to distinguish the claimed subject-matter from the closest prior art. The respondent nevertheless argued that the additional differences between the compositions to be compared were so minimal that they would have no influence on the properties of the composition, and that it was up to the appellant to demonstrate the contrary.

3.2.5 According to the established jurisprudence of the boards of appeal, each of the parties to the proceedings carries the burden of proof for the facts it alleges. As there is no apparent and compelling technical reason why

the above mentioned additional differences between the compositions to be compared according to the respondent's tests would have no influence on the properties of the composition, let alone any supporting evidence in this respect, the respondent's argument concerning the significance of the comparisons offered is merely speculative and cannot be retained.

Accordingly, the experimental tests relied on by the respondent cannot demonstrate a causal link between the change of structure of vinyl oligomer A, which results from its preparation by bulk polymerisation, instead of emulsion polymerization, and the purported improved chemical resistance and improved printability.

Therefore, the present decision does not deviate from the findings in decision T 197/86, relied upon by the respondent, according to which the nature of the comparison with the closest state of the art in comparative tests submitted to demonstrate an inventive step on the basis of an improved effect must be such that the effect is convincingly shown to have its origin in the distinguishing feature of the invention.

3.2.6 Since the respondent did not present corroborating evidence or an explanation making it credible that the purported technical benefit is achieved, that alleged advantage of the claimed aqueous compositions over the closest prior art cannot be taken into account.

3.2.7 Accordingly, the technical problem solved over the closest prior art by the claimed subject-matter as proposed by the respondent cannot be accepted and needs to be reformulated. In view of the above, the technical problem effectively solved (objective problem) can only be considered to lie in the provision of further aqueous coating or ink compositions.

3.3 Obviousness

- 3.3.1 It remains to be decided whether or not the proposed solution to the objective problem underlying the patent in suit is obvious in view of the state of the art.
- 3.3.2 It is not disputed that bulk polymerisation of vinyl polymers is a conventional technique in the art, as indicated in paragraph [48] of the patent in suit and confirmed in D6 (page 174, point 6.3.1) and D5 (column 2, lines 11-13). This technique as shown in D5 is in particular known to be employed in the same technical field of aqueous coating compositions for metal and glass surfaces, prepared via a two stages process, in which a conventional bulk polymerisation of a mixture of vinyl monomers provides a first carboxyl-group-containing polymer, to which water-soluble and water-insoluble monomers are added and polymerised via emulsion polymerisation in the presence of the first polymer (column 1, lines 5-10, column 2, lines 9-26 and examples 1 to 6).
- 3.3.3 Moreover, paragraph [16] of D1 teaches that the preparation of the water-soluble first polymer as defined in claim 1 of that document can be prepared by various techniques such as solution polymerisation, bulk polymerisation or emulsion polymerisation (see point 2.1.4 above). That paragraph follows the description in paragraphs [14] and [15] of D1 which provide a list of monomers to be employed to prepare the first polymer, including methacrylic acid, β -carboxyethylacrylate, methyl methacrylate, butyl acrylate, diacetone acrylamide and styrene, monomers used for the preparation of the water soluble polymers of example 11 and 12 of D1 and those of examples 1 to 3 of D3.

- 3.3.4 Therefore, starting either from the compositions disclosed in examples 11 and 12 of D1 or from the compositions described in examples 1-3 of D3, and having in mind the objective to merely provide further aqueous coating or ink compositions, the skilled person would find not only in D5, but also in paragraph [16] of D1 the suggestion to replace the water-soluble first polymers prepared by emulsion polymerisation of vinyl monomers in said examples 11 and 12 of D1 or said examples 1 to 3 of D3, by corresponding water-soluble first polymers based on the same vinyl monomers but obtained by bulk polymerisation.
- 3.3.5 The respondent's argument according to which the person skilled in the art starting from examples 11 or 12 of D1 and faced with the posed problem would not consider the teaching of paragraph [16] of D1 as the latter was to be read in line with the claims of D1 only fails to persuade. Whereas the skilled person merely analysing the disclosure of D1 in respect of those examples would not perform the mental act to modify those in the light of the information provided in paragraph [16] of that document, because he would have no reason to do so (see above points 2.1.3 to 2.1.5), the skilled person seeking to provide further aqueous coating or ink compositions than disclosed in those examples would be left with no choice as to modify them taking into account any envisageable measures known from the prior art, including a change of the preparatory method for obtaining the water-soluble first polymer as suggested in paragraph [16] of D1.
- 3.3.6 The respondent also argued that a person making emulsion polymers would be deterred to use the very different process of bulk polymerisation, as bulk polymerisation

and emulsion polymerisation required significant modifications. This allegation was made with reference to paragraph [71] of the patent in suit and the impossibility to use the same amount of α -methylstyrene used in a bulk polymerisation process in an emulsion polymerisation. Paragraph [71], however, does not refer to any deterrent for a skilled person starting from an oligomer that can be prepared by emulsion polymerisation to prepare an oligomer with the same monomers but by bulk-polymerisation, let alone in respect of the oligomers prepared by emulsion polymerisation in examples 11 and 12 of D1 or in examples 1 to 3 of D3.

3.3.7 Moreover, as indicated by the respondent in particular in view of D7, it is not disputed that bulk polymerisation is a different technique from emulsion polymerisation, requiring known measures, in particular different reaction temperatures, equipment and initiators. It is also not disputed that the skilled person based on the common general knowledge is able to perform such bulk polymerisation of vinyl monomers. In the absence of any evidence to the contrary and compelling reason why this would not be possible, it is concluded that the specific vinyl monomers used in examples 11 and 12 of D1 or those used in examples 1 to 3 of D1 for the preparation of the water-soluble polymer by emulsion polymerisation can be also bulk-polymerised, in line with the information provided in paragraphs [17], [20] and [24] of the patent in suit.

3.3.8 The respondent argued on the basis of D6 that bulk polymerisation is a cumbersome technique and that the disadvantages of bulk polymerisation would outweigh its benefits so that the skilled person would be deterred to prepare the first oligomer by bulk polymerisation. Given the established principle that the answer to the

question as to what a person skilled in the art would have done depends on the result he wished to obtain (T 939/92, OJ EPO 1996, 309; Reasons for the decision, point 2.5.3), the fact that, in the present case, the skilled person is deemed to be merely seeking to provide further aqueous coating or ink compositions, i.e. regardless of the difficulty to obtain such compositions, the use of bulk polymerisation for the preparation of the water-soluble first polymer is considered by the skilled person as a useful and obvious measure. In other words, the skilled person is merely accepting known disadvantages linked to the use of the bulk polymerisation, which cannot confer any inventive character to the aqueous compositions of operative claim 1. In addition, the Board notes that D6 recommends the use of bulk polymerisation for the preparation of low-molecular weight polymers (as in fact is done in D5, see column 3, line 68), so that D6 on the contrary would provide an incentive to use bulk polymerisation for preparing the low-molecular weight water-soluble polymers of D1 (see paragraph [17]) or D3 (see claim 1).

3.3.9 Finally, the respondent argued that emulsion polymerisation and bulk polymerisation would lead for the present type of polymers to polymers having different architectures and molecular weight distributions, which was not contested by the appellant, which in the respondent's opinion would prevent the skilled person from preparing a first water-soluble polymer by bulk polymerisation instead of by emulsion polymerisation. This argument also fails to convince, because the skilled person is merely seeking to provide further aqueous coating or ink compositions, i.e. compositions which do not necessarily contain a first water-soluble polymer being identical in all aspects, in

particular with respect to architecture and molecular weight distribution.

3.3.10 Accordingly, starting from D1 or D3, in particular from the compositions disclosed either in examples 11 and 12 of D1 or examples 1-3 of D3, the skilled person having in mind the objective to merely provide further aqueous coating or ink compositions would be guided by the prior art to prepare the first water-soluble polymer by bulk polymerisation rather than by emulsion polymerisation, arriving thereby in an obvious manner at aqueous compositions falling within the ambit of present claim 1.

3.4 In view of the above, the subject-matter of claim 1 of the patent in suit does not meet the requirements of Article 56 EPC. Consequently, the main request is not allowable.

Auxiliary requests I to III

4. The compositions prepared in examples 11 and 12 of D1, and examples 1 to 3 of D3 contain adipic acid bishydrazide (ADH) as crosslinking agent and the first water-soluble polymer of those compositions contain diacetone acrylamide as a cross-linkable vinyl monomer bearing a keto group (see above points 2.1.1. and 3.1.4, respectively).

5. Accordingly, the additional modifications contained in the auxiliary requests, i.e. use of a cross-linking agent (auxiliary requests I to III) and of a cross-linkable group which includes keto, aldehyde and/or acetoacetoxy carbonyl groups (auxiliary request II), in particular diacetone acrylamide (auxiliary request III), do not introduce any additional distinguishing features

over the aqueous compositions representing the starting point for assessing inventive step (starting from either D1 or D3 as closest prior art). As a result, claim 1 of any of the auxiliary requests still encompasses the embodiments of claim 1 of the main request which have been shown to be derivable in an obvious manner from the state of the art. Accordingly, these auxiliary requests must also fail on the same ground.

Order

For these reasons it is decided that:

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

The Registrar:

The Chairman:



B. ter Heijden

O. Dury

Decision electronically authenticated