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**Datasheet for the decision
of 26 March 2019**

Case Number: T 1655/15 - 3.3.03

Application Number: 09780196.3

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C08G18/67, C08G18/08

Language of the proceedings: EN

Title of invention:
AQUEOUS RADIATION CURABLE POLYURETHANE COMPOSITIONS

Patent Proprietor:
Allnex Belgium S.A.

Opponents:
BASF SE
Covestro Deutschland AG/ Bayer Intellectual
Property GmbH

Relevant legal provisions:
EPC Art. 84, 56
RPBA Art. 13(1)

Keyword:

Claim lacking clarity after amendment - main request and first to fourth auxiliary requests not allowable
Inventive step (no) - obvious alternative - fifth to eighth auxiliary requests
Auxiliary request submitted at the end of the oral proceedings - not admitted

Decisions cited:

G 0003/14



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Case Number: T 1655/15 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 26 March 2019

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
23 July 2015 concerning maintenance of the
European Patent No. 2300511 in amended form.**

Composition of the Board:

Chairman D. Semino
Members: F. Rousseau
 C. Brandt

Summary of Facts and Submissions

- I. The appeal is directed against the interlocutory decision of the opposition division posted on 23 July 2015 according to which European patent No. 2 300 511 as amended according to the documents of the main request filed on 29 April 2015 met the requirements of the EPC.
- II. Claim 1 of the main request read as follows (for ease of understanding the Board has indicated by comparison to the text as granted additions in underlined, and deletions in strikethrough):
- "1. An aqueous composition comprising :
- from 5 to 90 % by weight of a polymerizable ethylenically unsaturated water dispersible polyurethane (A) containing at least \geq 0.2 meq/g of allophanate groups and obtained from the reaction of 10 to 60 weight % of at least one polyisocyanate (i), 3 to 25 weight % of at least one hydrophilic compound (ii) containing at least one reactive group capable to react with isocyanate groups and at least one group which is capable to render the polyurethane dispersible in aqueous medium either directly or after a reaction with a neutralizing agent to provide a salt, and 20 to 85 weight % of at least one polymerizable ethylenically unsaturated compound (iii) containing at least one reactive group capable to react with isocyanate groups; and
 - from ~~±~~ 15 to 60 % by weight relative to the weight of polyurethane (A) of a least one polymerizable ethylenically unsaturated compound (B) having a water solubility at 25 °C of less than 50 g/l, wherein compound (B) is a (meth)acrylate with a molecular weight of at most 1000."

III. The decision was taken having regard to the following documentary evidence amongst others:

D3: WO 2007/063025 A1

D5: EP 1 645 582 A1

D6: EP 0 694 531 A2

D16: EP 1 328 565 B1.

IV. The reasons for the contested decision, as far as they are relevant to the appeal proceedings, can be summarized as follows. Document D16 was admitted into the proceedings, as well as the main request. The amended claims fulfilled the requirements of Article 123(2) EPC. In particular, the amendment in claim 1 of the amount of compound (B) from 1-60 % by weight to 15-60 % by weight was based on the application as filed. This amendment did not introduce deficiencies under Article 123(3) or 84 EPC either. Regarding sufficiency of disclosure, the objection against claim 1 concerning the impossibility to prepare the composition with an amount of compound (A) in the upper range defined in that claim and the objection relating to the determination of the content of allophanate groups of compound (A) were mere objections under Article 84 EPC, which according to the ruling of G 3/14 could not be examined, as the challenged features were already present in the claims as granted. Novelty *inter alia* over each of D3 and D16 was acknowledged. As regards inventive step, the compositions of Examples 2 and 5 in Table 2 of D16, as well as those of Examples 7 and 8 in Table 3 of that document represented the closest prior art. The subject-matter of claim 1 differed from the closest prior art among others in that the allophanate group content of component (A) was at least 0,2 meq/g. In the absence of any evidence for a technical effect arising from said distinguishing

feature, the objective technical problem solved over the closest prior art was formulated as the provision of an alternative aqueous radiation-curable polyurethane dispersion for making coatings exhibiting a combination of good mechanical properties (hardness, water and solvent resistance, scratch resistance) and high gloss. None of the cited documents taught to introduce allophanate groups in the claimed amount in order to provide such an alternative to the compositions of the closest prior art. D3 in addition did not relate to gloss properties and therefore would not have been taken into consideration by the skilled person. The presence of an inventive step was therefore acknowledged.

- V. Appeals against that decision were lodged by opponent 1 (appellant I) and opponent 2 comprised of two legal persons, one of those withdrawing its appeal with letter of 26 August 2015. The remaining legal person will be referred to as appellant II.
- VI. By letter of 13 April 2016 the patent proprietor (respondent) replying to the statements of grounds of appeal of appellants I and II referred to the first to fourth auxiliary requests submitted before the opposition division. An additional set of claims as fifth auxiliary request was submitted with said letter. Claims 1 of the first to fifth auxiliary requests were as follows :

First auxiliary request (submitted with letter of 29 April 2015)

Claim 1 was identical to claim 1 of the main request.

Second auxiliary request (submitted with letter of 29 April 2015)

Compared to claim 1 of the main request claim 1 of the second auxiliary request contained the additional wording at the end of the claim:

"; wherein the polyurethane (A) is obtained by a process comprising the reaction of a stoichiometric excess of polyisocyanate (i) with polymerizable ethylenically unsaturated compound (iii), a second step comprising the reaction of the product of the first step with hydrophilic compound (ii) and a third step wherein the remaining free isocyanate groups provided by polyisocyanate (i) are reacted to give allophanate groups"

Third auxiliary request (submitted with letter of 25 June 2015)

Compared to claim 1 of the second auxiliary request claim 1 of the third auxiliary request contained the additional wording at the end of the claim:

"; and wherein the equivalent ratio of isocyanate groups provided by compounds (i) to isocyanate-reactive groups provided by compounds (ii) and (iii) is from 1.05 : 1 to 2 : 1, preferably from about 1.1 : 1 to 1.45 : 1"

Fourth auxiliary request (submitted with letter of 25 June 2015)

Compared to claim 1 of the main request claim 1 of the fourth auxiliary request contained the additional wording at the end of the claim:

"; wherein the polymerizable ethylenically unsaturated compound (B) is selected from alkoxyated (meth)acrylated compounds"

Fifth auxiliary request (submitted with letter of 13 April 2016)

Claim 1 of the fifth auxiliary request differed from claim 1 of the main request solely in that the amount of component (A) had been amended from 5 to 90 % by weight to 10 to 60 % by weight.

VII. A communication of the Board dated 24 January 2019 sent in preparation for oral proceedings was issued.

VIII. The respondent submitted with letter of 26 February 2019 a document labelled Annex 3 in which the structure of the polyurethanes obtained in the patent in suit and in the prior art were schematically compared. In addition three additional auxiliary requests were submitted whose claims 1 read as follows:

Sixth auxiliary request

Claim 1 of that request corresponded to claim 1 of the fifth auxiliary request in which the amendment introduced in claim 1 of the second auxiliary request had been inserted, albeit right before the definition of the wording defining the amount of compound (A).

Seventh auxiliary request

Claim 1 of the seventh auxiliary request differed from claim 1 of the fifth auxiliary request solely in that the amount of component (B) was not defined to be from 15 to 60 % by weight relative to the weight of the

polyurethane (A), but from 3 to 30 % by weight (i.e. relative to the weight of the aqueous composition) and the aqueous composition was defined to contain from 20 to 80% by weight of water.

Eighth auxiliary request

Claim 1 of the eighth auxiliary request differed from claim 1 of the fifth auxiliary request in that it contained both amendment to the fifth auxiliary request carried out in the sixth and seventh auxiliary requests.

IX. During the oral proceedings which took place on 26 March 2019 the respondent submitted following the Board's deliberation on the first to eighth auxiliary requests an additional request labelled "auxiliary request 9" whose claim 1 read as follows:

"1. Process for preparing a coated substrate or article, wherein the substrate or article is coated with an aqueous composition comprising :

- from 5 to 90 % by weight of a polymerizable ethylenically unsaturated water dispersible polyurethane (A) containing at least 0.2 meq/g of allophanate groups and obtained from the reaction of 10 to 60 weight % of at least one polyisocyanate (i), 3 to 25 weight % of at least one hydrophilic compound (ii) containing at least one reactive group capable to react with isocyanate groups and at least one group which is capable to render the polyurethane dispersible in aqueous medium either directly or after a reaction with a neutralizing agent to provide a salt, and 20 to 85 weight % of at least one polymerizable ethylenically unsaturated compound (iii) containing at least one

reactive group capable to react with isocyanate groups;
and

- from 1 to 60 % by weight relative to the weight of polyurethane (A) of a least one polymerizable ethylenically unsaturated compound (B) having a water solubility at 25 °C of less than 50 g/l, wherein compound (B) is a (meth)acrylate with a molecular weight of at most 1000; wherein the compound (B) is selected from alkoxyated (meth)acrylated compounds, wherein the substrate or article is a wood substrate or article and wherein the composition is used as a UV stain."

- X. The submissions of the appellants, as far as relevant for the decision, can be summarised as follows:

Main request and first to fourth auxiliary requests

- (a) The ambiguity concerning the amounts of components (A) and (B) in claim 1 of the main request arose out of the amendment after grant of the minimum value of the weight ratio of component (B) to component (A), which had been changed from 1 % to 15 %. This issue could therefore be addressed. Claim 1 should be clear per se and there was no need to construe its meaning. Accordingly, claim 1 of the main request and claims 1 of the first to fourth auxiliary requests which contained the same ambiguous features lacked clarity.

Fifth to eighth auxiliary requests

- (b) The closest prior art was represented by the coating composition described in any of Examples 2, 5, 7 and 8 of D16, from which the claimed coating compositions differed only in the content of

allophanate groups of the polyurethane compound (A). Appellant II requested not to admit into the proceedings the respondent's submission brought forward for the first time during the oral proceedings that the water solubility of component (B) constituted a further difference over the closest prior art, should this submission be found relevant by the Board. Should it be admitted, it was requested that the oral proceeding be postponed.

- (c) Since the feature distinguishing the claimed coating compositions from those of the closest prior art, i.e. a content of allophanate groups in the polyurethane resin, had not been shown to result in any technical effect, the objective problem solved over the closest prior art could only be formulated as the provision of further aqueous UV-curable polyurethane compositions which were suitable to be coated on various substrate.
- (d) The use of polyurethanes comprising allophanate groups in aqueous UV-curable coating compositions comprising a reactive diluent was known from D3 (page 1, lines 5-7; page 3, lines 26-41; page 22, lines 9 and 16-18), D3 describing on page 5, line 12-19 the content of allophanate groups employed in operative claim 1. D16 (paragraph [0016]) also suggested the use of allophanate groups in the polyurethane compound of the coating composition. Moreover the sequence of steps defined in the sixth auxiliary request for the reaction of components (i) to (iii) was described in D5 (paragraphs [0013] and [0051]) and D6 (page 2, lines 21 to 39).

- (e) The arguments against the existence of an inventive step of the the subject-matter defined in the seventh and eighth auxiliary requests were the same as those submitted in relation to the fifth and sixth auxiliary requests.
- (f) Therefore, the subject-matter according to claim 1 of any of the fifth to eighth auxiliary requests lacked an inventive step.

Auxiliary request 9

- (g) Whereas appellant II had no objection against the admission of auxiliary request 9 into the proceedings, appellant I objected its admission arguing the absence of any justification for submitting this auxiliary request at this stage of the proceedings and the fact that appellant I could not be sufficiently prepared to deal with it.

XI. The submissions of the respondent, as far as relevant for the decision, can be summarised as follows:

Main request and first to fourth auxiliary requests

- (a) Even if claim 1 of the main request was open to an objection under Article 84 EPC, claim 1 needed to be construed as usually done before analysing any requirement of the EPC. The skilled person in interpreting claim 1 would rule out an interpretation of that claim which was illogical. The skilled person would realize that the total amount of the components of the claimed composition would exceed 100 % by weight if the amount of component A exceeded a specific threshold value which could be calculated to be about 87 % by

weight. Since trying to work out the claimed invention with an amount of component (A) above this threshold value would be illogical, the skilled person would understand the scope of claim 1 to not include compositions with an amount of component A exceeding that threshold value. Accordingly, no lack of clarity arose in respect of the main request. The same applied to claim 1 according to any of the first to fourth auxiliary requests.

Fifth to eighth auxiliary requests

- (b) The closest prior art was represented by any of the coating compositions described in Examples 2, 5, 7 and 8 of D16, from which the claimed coating compositions differed not only in the content of allophanate groups of the polyurethane compound (A), but also in that the reactive component used, i.e. compound (B) had a specific water solubility at 25 °C. The respondent not wishing to comment on the request of Appellant II not to admit into the proceedings the submission that compound (B) represented a second distinguishing feature over the closest prior art left it to the Board to decide on this request in accordance with the RPBA.

- (c) Having regard to the comparative tests shown in Tables 1 and 2 of the patent in suit, the problem solved vis-à-vis the closest prior by the coating compositions of claim 1 resided in the provision of aqueous UV-curable polyurethane compositions having improved stability, which were suitable for coating on wood and plastic substrates and which led to coatings having improved gloss, improved mirror effect and improved stain resistance.

- (d) D16 did not suggest to use either a component (B) having a low water-solubility or a minimum amount of allophanate groups, the use of allophanate group being only one of the possibilities envisaged in that document. Moreover, neither D3 nor D5 addressed the technical effects of high gloss, mirror effect and stain resistance. Hence, the skilled person would not have been motivated to combine the teaching of D16 with either D3 or D5. Furthermore, D3 did not contain any working example dealing with the preparation of polyurethanes comprising allophanate groups, D3 referring for their synthesis on page 37 of the experimental part to example 1 of D2.
- (e) Moreover, for the preparation of the polyurethane containing allophanate groups, the sequence of steps in which components (i), (ii) and (iii) were reacted as defined in the sixth auxiliary request was different from that followed in D3. As shown in Annex 3 submitted before the opposition division and resubmitted with letter of 26 February 2019 the order of the reaction steps used in the patent in suit led to polyurethanes having different structures and accordingly to coatings having different properties.
- (f) It was acknowledged that the experimental tests of the patent in suit relied on by the respondent did not provide a comparison vis-à-vis the coating compositions of D16 and that those tests only related to the effect brought about by the use of compound (B) defined in operative claim 1. However, even if an improvement was not acknowledged, the formulation of the problem should be made at least having regard to the fact that the claimed

compositions led to coatings exhibiting an excellent mirror effect.

- (g) The sole purpose of the amendments contained in the seventh and eighth auxiliary requests was to overcome the objection under Article 123(2) EPC against the fifth auxiliary request raised by appellant II in a written submission of 5 February 2019. The arguments in support of an inventive step were for these requests the same as for the fifth and sixth auxiliary requests.
- (h) Accordingly, the prior art did not render obvious the coating compositions according to any of the fifth to eighth auxiliary requests.

Auxiliary request 9

- (i) Auxiliary request 9 consisted of a single claim corresponding to claim 15 of the main request on file. It had been submitted as it contained additional distinguishing features. It had been already addressed by the appellants during the appeal proceedings so that no new issue arose. It should be therefore admitted into the proceedings.

XII. The appellants I and II requested that the decision under appeal be set aside and that the European patent No. 2 300 511 be revoked. In addition appellant I requested not to admit auxiliary request 9 into the proceedings.

XIII. The respondent requested that the appeals be dismissed, i.e. maintenance of the patent as upheld by the opposition division (main request), or, that the patent be maintained on the basis of any of the first or

second auxiliary requests filed with letter dated 29 April 2015, or on the basis of the third or fourth auxiliary requests filed with letter dated 25 June 2015, or on the basis of the fifth auxiliary request filed with letter dated 13 April 2016, or on the basis of any of the sixth to eighth auxiliary requests filed with letter dated 26 February 2019, or on the basis of auxiliary request 9 filed during the oral proceedings.

Reasons for the Decision

Main request - clarity

1. Claim 1 defines that the composition comprises from 5 to 90 % by weight of polyurethane (A) and from 15 to 60 % by weight relative to the weight of polyurethane (A) of at least one component (B). For amounts of (A) in the upper range defined in claim 1, i.e for amounts of at least 87 % by weight of the composition, the sum of the amounts of components (A) and (B) in the composition would be, even with the minimum amount required for component (B) of 15% by weight relative to the weight of component (A), in excess of 100 % based on the weight of the composition. This lack of compatibility between the maximum amount of component (A) which can be used in accordance with the wording of claim 1 and the minimum amount of component (B) to be used, renders the definition for the amount of those components and accordingly the definition of the subject-matter for which protection is sought ambiguous. This ambiguity is even more blatant in view of the requirement that the composition is an aqueous composition, and therefore must contain in addition a minimum amount of water, making it even more difficult

for the skilled person to understand which maximum amount of component (A) and which minimum ratio of component (B) to component (A) are meant in operative claim 1.

- 1.1 It is undisputed that this clarity issue arises from an amendment made in opposition proceedings, namely the amendment of the minimum value of the weight ratio of component (B) to component (A) which was changed from 1 % to 15 %, so that following the ruling of decision G 3/14 of the Enlarged Board of Appeal (OJ 2015, A102) this issue under Article 84 EPC can be addressed in the present appeal proceedings.
- 1.2 The respondent's argument that the skilled person would understand that the maximum amount of component (A) is necessarily below 87 % by weight in order to obtain a composition whose components do not sum up to a total amount of more than 100 % by weight is not convincing. Faced with the above mentioned incompatibility the skilled person could equally envisage that the minimum value of the weight ratio of component (B) to component (A) was erroneously set too high and accordingly should be interpreted to be lower. Taking into account that the composition per definition must necessarily comprise a minimum amount of water, the skilled person is unable in either case to understand the limits of claim 1 with respect to the maximum amount of component (A) and the minimum amount of (B) relative to the amount of compound (A). Accordingly, the subject-matter for which protection is sought with claim 1 is not clearly defined contrary to the requirements of Article 84 EPC.
- 1.3 The main request is therefore refused.

First to fourth auxiliary requests - clarity

2. Claim 1 of the first auxiliary request is identical to claim 1 of the main request. Moreover, compared to claim 1 of the main request claim 1 according to any of the second to fourth auxiliary requests has been amended solely by modifying the definition of components (A) and (B), but not their amount. Accordingly the objection against claim 1 of the main request that its subject-matter lacks clarity in view of the definition of the amounts of components (A) and (B) equally applies to claim 1 according to any of the first to fourth auxiliary requests. Therefore, the first to fourth auxiliary requests are also not allowable.

Fifth auxiliary request

3. Compared to claim 1 of the main request, claim 1 of the fifth auxiliary request has been amended to define the amount of component (A) to be in the range of 10 to 60 % by weight instead of 5 to 90 % by weight. Claim 1 of the fifth auxiliary request was not objected to lack clarity. The Board has no reason to take a different view, since the restriction of the maximum amount of component (A) from 90 to 60 % by weight allows for the composition to comprise at least 15 % by weight of component (B) and enough water to consider the claimed composition as an aqueous composition. Accordingly, the amendments inserted in claim 1 of the fifth auxiliary request overcome the clarity objection raised against the main request.

Inventive step

Closest state of the art

4. The closest prior art for the purpose of assessing inventive step is that which corresponds to a purpose or effect similar to that of the invention and requiring the minimum of structural and functional modifications (see Case Law of the Boards of Appeal of the EPO, 8th edition, 2016, I.D.3.1).
- 4.1 It can be derived from paragraphs [0004] and [0006] of the specification, that the patent in suit aims at providing aqueous radiation-curable polyurethane compositions which lead to coatings having high end hardness, scratch and stain resistance, as well as an excellent mirror effect. According to paragraph [0004] the ability to obtain an excellent mirror effect is known to depend on the capability to provide very flat coatings. Although it can be taken from the whole specification that the focus of the present invention is primarily to provide such coatings on wood and plastics, it is also sought to provide coatings on other materials such as glass, metal and concrete (paragraph [0054] of the specification).
- 4.2 Document D16 is like the patent in suit concerned with aqueous coating compositions comprising a polymerizable ethylenically unsaturated water dispersible polyurethane (claim 1; paragraph [0031]). Examples 2, 5, 7 and 8 of D16 describe compositions leading to coatings having good appearance (Tables 2 and 3, page 12), which means in the light of paragraph [0070] of that document, high gloss and a smooth surface, which implicitly constitutes a requirement for obtaining a mirror effect. All parties took the view that any of

the compositions described with Examples 2, 5, 7 and 8 of D16 represented a suitable starting point for the skilled person seeking to solve the problem addressed in the patent in suit. The Board has no reason to take a different view.

4.3 As to the question which of those exemplified coating compositions of D16 requires the minimum of structural and functional modifications to arrive at the subject-matter of operative claim 1, it was not disputed that the use of a polymerizable ethylenically unsaturated water dispersible polyurethane (A) containing at least 0,2 meq/g of allophanate groups represented a distinguishing feature of the present invention with respect to any of the compositions. The parties, however, were in dispute as to whether the compositions of operative claim 1 differ further from those of said Examples of D16 in that the (meth)acrylate compound has a water solubility value at 25 °C of less than 50 g/l.

4.4 Whereas the compound of Examples 2 and 5 alleged to correspond to compound (B) of operative claim 1 is a commercial product sold under the trade name Craynor 132, whose water solubility value at 25 °C was not indicated by the parties, there is no doubt that trimethylol propane trimethacrylate contained in the coating compositions of Examples 7 and 8 (paragraph [0092], page 12, line 40) is a compound (B) in accordance with operative claim 1, since the same compound is described in paragraph [0040] of the patent in suit (page 5, line 14) to be a compound (B) in accordance with a preferred embodiment of the present invention. Therefore the argument of the respondent that the coating compositions of operative claim 1 differed from those exemplified in D16 also by the use of a reactive component (B) having a specific water

solubility fails to convince, at least in respect of the compositions of Examples 7 and 8.

4.5 Accordingly, since it cannot be held that the compositions of Examples 2 and 5 of D16 are structurally closer to the compositions of operative claim 1 than those described with Examples 7 and 8 of D16, the Board is satisfied that the disclosure of each of the latter examples represents in an equivalent manner the closest prior art and starting point for assessing inventive step.

4.6 It results from the above analysis that the content of allophanate groups of the polymerizable ethylenically unsaturated water dispersible polyurethane (i.e. at least 0,2 meq/g), represents the sole feature distinguishing the claimed coating compositions from the closest prior art.

Problem successfully solved

5. Relying on the comparative tests shown in Tables 1 and 2 of the patent in suit, the respondent regarded the problem solved over the closest prior art as the provision of aqueous UV-curable polyurethane compositions having improved stability, which are suitable for coating on wood and plastic substrates and which lead to coatings having improved gloss, improved mirror effect and improved stain resistance.

5.1 According to the established jurisprudence, if comparative tests are relied upon 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

features distinguishing the invention from the closest state of the art (Case Law, supra, I.D.10.9). This is not the case for the experimental comparison provided in the patent in suit, since those tests, as acknowledged by the respondent, rather concern a comparison made to demonstrate advantages brought about by compound (B) of operative claim 1, which compound (B) is already contained in the compositions of the closest prior art.

- 5.2 Consequently, it follows that the respondent has not presented any corroborating evidence rendering it credible that the purported technical effects of improving the stability of the coating composition and improving the gloss, the mirror effect and the stain resistance of the resulting coatings in comparison to the closest prior art are achieved by the compositions of operative claim 1. Accordingly, any such advantage of the claimed coating compositions over the closest prior art cannot be taken into account for the purpose of assessing inventive step (see Case Law, supra, I.D. 4.2).
- 5.3 The respondent also submitted that the claimed coating compositions lead to coatings exhibiting an excellent mirror effect and that this technical effect should be retained for the formulation of the problem solved over the closest prior art. However, the problem to be determined is that solved over or by reference to the prior art, meaning that the formulation of a problem defining in absolute terms a level of mirror effect without any comparison with the closest prior art cannot be accepted. Whether the mirror effect obtained with the claimed coating compositions is better, similar or worse, is in the present case unknown, since as indicated above the sole experimental evidence

relied upon by the respondent does not allow to determine the effect of the content of allophanate groups of the polymerizable ethylenically unsaturated water dispersible polyurethane on that property.

- 5.4 Accordingly, the problem successfully solved by the subject-matter of claim 1 over the closest prior art can only be formulated, in line with the arguments presented by the appellants, as the provision of further polyurethane coating compositions which also are suitable for application on various substrates.

Obviousness of the solution

6. It remains to be decided whether or not the proposed solution to the above problem, i.e. coating compositions as defined in operative claim 1 which are characterized by a content of allophanate groups of the polymerizable ethylenically unsaturated water dispersible polyurethane of at least 0,2 meq/g is obvious in view of the state of the art.

- 6.1 D16 itself teaches in paragraph [0016] that the (meth)acryloyl-functional polyurethane can be prepared with polyisocyanates modified by the introduction of urethane, allophanate, urea, biuret, carbodiimide, uretonimine or isocyanurate residues. These constitute for the skilled person well-known groups formed during the synthesis of polyurethanes, as is for example also illustrated in D3 (whole page 20 and page 21, lines 1 to 23 and passage from page 5, line 6 to page 6, line 6). As far as allophanate groups are concerned, the skilled person is well aware that polyurethane compounds containing allophanate groups are formed using an excess of isocyanate groups, whereby unreacted isocyanate groups can be obtained in the last step of

the synthesis, using if necessary an appropriate catalyst. Reference can be made for example to D6 (page 2, lines 21 to 39) and D5 (paragraphs [0013], [0015] and [0051] and examples 1 bis 3).

- 6.2 Furthermore, the specific choice of a lower limit of 0,2 meq/g for the content of allophanate groups has not been demonstrated to be related to any technical effect. It is undisputed that such a minimum amount corresponds as indicated by appellant I to an amount of 2 % by weight, which is precisely the preferred minimum amount according to the teaching of D3 (page 5, lines 17-19). This threshold therefore has to be regarded as a mere arbitrary choice for the skilled person faced with the problem of providing further coating compositions.
- 6.3 Therefore, seeking to solve the problem identified in above section 5.4 the skilled person would have found obvious in the light of D16 and the common general knowledge concerning the chemistry of polyurethane reactions, illustrated by the information provided in this respect in documents D3, D5 and D6, to use a polymerizable ethylenically unsaturated water dispersible polyurethane comprising at least 0,2 meq/g of allophanate groups, thereby arriving in an obvious manner at coating compositions falling within the ambit of claim 1 of the fifth auxiliary request.
- 6.4 Accordingly, the subject-matter of claim 1 of the fifth auxiliary request which encompasses obvious embodiments does not meet the requirements of Article 56 EPC.

Sixth auxiliary request

7. Claim 1 of the sixth auxiliary request corresponds to claim 1 of the fifth auxiliary request in which it is defined that the polyurethane (A) is obtained by a process comprising the reaction of a stoichiometric excess of polyisocyanate (i) with polymerizable ethylenically unsaturated compound (iii), a second step comprising the reaction of the product of the first step with hydrophilic compound (ii) and a third step wherein the remaining free isocyanate groups provided by polyisocyanate (i) are reacted to give allophanate groups.

7.1 Independently of the question whether said process features necessarily imply differences in the claimed composition, it was not argued, let alone shown that such differences resulting from the specific order of reaction of compounds (i) to (iii) defined in claim 1 of the sixth auxiliary request would bring about any technical advantage so that the presence of the additional process features in claim 1 of the sixth auxiliary request do not result in a different formulation of the problem effectively solved by the claimed invention over the closest prior art.

7.2 As shown in above point 6.1 the use of a stoichiometric excess of polyisocyanate is a requirement known in the art in order to allow, for example in the last step of the synthesis, the production of allophanate groups by reacting the remaining free isocyanate groups. Moreover, the specific order of reaction of the components used for the preparation of polyurethane (A) is precisely the one suggested in the passage of D6 mentioned above (page 2, lines 21 to 39). More particularly, the product (A) described on page 2,

lines 24-26 of D6 is the product of the reaction in a first step of a stoichiometric excess of a polyisocyanate (i) with a polymerizable ethylenically unsaturated compound (iii). In a second step, (A) is reacted with 2,2-bis(hydroxymethyl)-propionic acid (i.e. a hydrophilic compound (ii) within the meaning of operative claim 1 as confirmed by paragraph [0024] of patent in suit, page 4, line 8) forming an intermediate compound (AB) and in a third step the remaining free isocyanate groups (i.e. those provided by polyisocyanate (i) used in the first step) are reacted with a compound (C) comprising isocyanate groups until complete reaction of the remaining free isocyanate groups to form allophanate groups, which way of proceeding falls within the broad definition provided in operative claim 1.

7.3 It is therefore concluded that the use of the additional process features comprised in claim 1 of the sixth auxiliary request in order to solve the problem defined in above point 5.4 would have been suggested by D6 to the skilled person, who therefore would have arrived in an obvious manner at the subject-matter of claim 1 of the sixth auxiliary request, independently of the question whether said process features result in additional structural differences in the claimed composition.

7.4 Accordingly, the subject-matter of claim 1 of the sixth auxiliary request does not meet the requirements of Article 56 EPC either.

Seventh and eighth auxiliary requests

8. The additional amendments contained in claim 1 of the seventh auxiliary request and of the eighth auxiliary

request merely concern the definition of the amounts of water and components (A) and (B) comprised in the coating composition. The respondent submitted that the sole purpose of these amendments was to overcome the objection under Article 123(2) EPC raised by appellant II in a written submission dated of 5 February 2019. It was agreed by the parties that these amendments did not have any impact on their analysis of inventive step and accordingly, that any finding in respect of the inventiveness of the coating compositions defined in requests of higher ranking would equally apply to the coating compositions defined in claims of the seventh and eighth auxiliary requests. The Board therefore concludes that the subject-matter defined in claim 1 of the seventh and of the eighth auxiliary requests does not, for the same reasons, meet the requirements of Article 56 EPC.

Auxiliary request 9

9. According to Article 13(1) of the RPBA, any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.
- 9.1 In the case at hand, the appellant filed auxiliary request 9 at the end of the oral proceedings before the Board after the Chairman had announced the Board's conclusion that the subject-matter of claim 1 of the fifth to eighth auxiliary requests, the sixth to eighth auxiliary requests having been filed with letter dated 26 February 2019, did not involve an inventive step. Auxiliary request 9 consists of a single claim which

corresponds to claim 15 according to the amended request upheld by the opposition division in the decision under appeal.

- 9.2 One factor to be considered in the exercise of the Board's discretion is whether the newly filed request can be considered *prima facie* allowable at least in the sense that all previous objections, in the present case in particular the objection that the subject-matter of the fifth to eighth auxiliary requests lacked an inventive step, have been overcome.
- 9.3 The appellant did not provide any reasons, why auxiliary request 9 was only filed at that very late stage of the appeal proceedings, nor did he explain whether and for which reasons this new request removed the objections against the preceding requests and thus complied with the requirements of the EPC. The mere constatation that the claim of this auxiliary request contain additional features bringing more distance to the closest prior art does not allow the conclusion the additional features contained in that claim would remove the objection of lack of inventive step over D16. Corresponding explanations were also not provided in writing, although that claim was present in the main request as submitted by the respondent. Moreover, in the absence of arguments to the contrary it is the Board's view that auxiliary request 9 could and should have been filed with accompanying submissions at least concerning inventive step at the latest together with the sixth to eighth auxiliary request submitted with letter dated 26 February 2019. Therefore, the Board exercised its discretion in view of the current state of the proceedings and the need for procedural economy by not admitting auxiliary request 9 into the proceedings.

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

D. Semino

Decision electronically authenticated