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**Datasheet for the decision  
of 26 September 2018**

**Case Number:** T 1484/15 - 3.3.03

**Application Number:** 07724688.2

**Publication Number:** 2013256

**IPC:** C08G18/36, C08G18/42,  
C08G18/08, C08G18/34,  
C08G18/32, C08G18/12,  
C08G18/66, C09D175/14

**Language of the proceedings:** EN

**Title of invention:**

OIL BASED AQUEOUS POLYURETHANE DISPERSIONS

**Patent Proprietor:**

ALLNEX AUSTRIA GmbH

**Opponent:**

Covestro Deutschland AG

**Relevant legal provisions:**

EPC Art. 54, 56  
RPBA Art. 13(3)

**Keyword:**

Novelty - (yes)

Inventive step - obvious alternative (main request and auxiliary requests 1-4)

Auxiliary request 5 submitted at the oral proceeding (not admitted)

**Decisions cited:**

T 0939/92



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Case Number: T 1484/15 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 26 September 2018**

**Appellant:** Covestro Deutschland AG  
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**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
21 May 2015 concerning maintenance of the  
European Patent No. 2013256 in amended form.

**Composition of the Board:**

**Chairman** D. Semino  
**Members:** F. Rousseau  
R. Cramer

## Summary of Facts and Submissions

I. The appeal by the opponent is directed against the interlocutory decision of the opposition division according to which European patent No. 2 013 256 as amended according to the documents of the main request submitted with letter of 27 February 2015 met the requirements of the EPC.

II. Claim 1 of that request read as follows:

"1. A two-pack coating composition comprising

- curing agents selected from the group consisting of non-blocked polyfunctional isocyanates **I**, polyaziridines **Z**, and carbodiimides **Y**, and
- an aqueously dispersed polyurethane **U** wherein the polyurethane **U** comprises building blocks derived from the following educts:
  - polyfunctional isocyanates **A**,
  - oils **B** that are esters of polyhydric alcohols **B1** and fatty acids **B2**, wherein at least a mass fraction of 40 percent of the said fatty acids **B2** is comprised of fatty acids **B21** which have at least one hydroxyl group and, optionally, at least one olefinic unsaturation, such oils **B** having a hydroxyl number of from 120 mg/g to 230 mg/g,
  - low molar mass polyols **C** having a number average molar mass  $M_n$  of up to 400 g/mol,
  - optionally, long-chain polyols **C'** having a number-average molar mass in excess of 400 g/mol, such as polyether polyols, and polyester polyols,
  - compounds **D** which possess at least two groups which are reactive toward isocyanate groups and at least one group which is capable of forming anions,

- compounds **F** which carry at least one hydroxyl group **F1** and at least one functional group **F2** selected from the group consisting of amino and mercapto groups, and hydroxyl groups **F21** that are activated so that their reactivity towards isocyanate groups is higher than that of hydroxyl group **F1**."

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

D2: DE 199 30 961 A1

D3: Excerpt of Wikipedia "Rizinusöl"

D4: EP 1 026 186 A1.

IV. The opposition division decided that the claimed subject-matter did not extend beyond the content of the application as filed, was sufficiently disclosed and novel. As regards inventive step, starting from D2 as the closest prior art, the problem solved by the claimed subject-matter was the provision of an alternative polyurethane coating which was suitable for application on wood. Whereas using ethanol amine instead of ethylene diamine and varying the polyester oligomer of the example of D2 to arrive inherently at the required hydroxyl value constituted obvious measures, D2 did not suggest to modify the one-pack composition of the example on page 4 of D2 to a two-pack composition, because this would contradict the teaching provided on page 2, lines 17-18 of that document. The presence of an inventive step was therefore acknowledged.

V. An appeal against that decision was lodged by the opponent (hereafter appellant). The statement of grounds of appeal including documents:

D10: Irle et al. (2002), „Waterborne Parquet Coatings Based on Crosslinked Polyurethane Dispersions“, Paint & Coatings Industry, Vol. 18, Issue 2, page 28  
D11: Datasheet Bayhydrol® XP 2557  
D12: Datasheet Bayhydrol® XP 2593  
D13: Presse release Bayer MaterialScience AG, 2005  
D14: DE 1 49 5745  
D15: Dieterich (1970), „Polyurethan-Ionomere, eine neue Klasse von Sequenzpolymeren“, Angewandte Chemie, Vol. 82, pages 53-63  
D16: Dieterich (1981), „Neue wässrige PUR-Systeme“, Die Angewandte Makromolekulare Chemie, Vol. 98, pages 133-165.

VI. With its rejoinder the patent proprietor (hereafter respondent) maintained its auxiliary requests 1 to 4 as submitted before the opposition division. The wording of claim 1 of those auxiliary requests differed from that of claim 1 of the main request in the following manner:

*Auxiliary request 1 (filed on 27 February 2015)*

Polyaziridines **Z**, and carbodiimides **Y** were deleted from the list of curing agents.

*Auxiliary request 2 (filed on 27 February 2015)*

The term „, optionally,“ before the feature "at least one olefinic unsaturation" in the definition of oils **B** was deleted.

*Auxiliary request 3 (filed on 22 April 2015)*

The following wording was added at the end of the claim:

"; wherein said aqueously dispersed polyurethane **U** is obtained by a process which comprises the steps of

- synthesising an isocyanate-functional prepolymer by reacting polyfunctional isocyanates **A** with oils **B**, low molar mass polyols **C**, and compounds **D**, to give a prepolymer which contains free NCO groups, which is then reacted with compounds **F**, under at least partial consumption of the said free NCO groups,
- at least partly neutralising the group capable of forming anions in the compound **D**, to form anionic groups, and
- dispersing this polymer in water."

*Auxiliary request 4 (filed on 22 April 2015)*

Claim 1 of auxiliary request 4 corresponded to claim 1 of auxiliary request 3.

- VII. Following the communication of the Board of 26 July 2018 sent in preparation for the oral proceedings, the respondent submitted with letter of 24 August 2018 an auxiliary request 5.
- VIII. During the oral proceedings which took place on 26 September 2018 auxiliary request 5 submitted with letter of 24 August 2018 was replaced by a new auxiliary request 5. The wording of claim 1 of auxiliary request 5 differed from that of claim 1 of the main request in that at the end of the definition of oils **B** those were specified to have a hydroxyl number of from 140 mg/g to 190 mg/g instead of from 120 mg/g to 230 mg/g.

IX. As far as relevant to the present decision, the submissions of the appellant can be summarized as follows:

*Main request - novelty*

(a) D2 disclosed on page 2, lines 1-2 and 46-47 an aqueously dispersed polyurethane. The polyurethane component was built up of polyfunctional isocyanates (page 2, line 58), an oil comprising up to 85% castor oil (page 2, lines 46-49) obtained by transesterification of said castor oil with another oil (page 3, lines 41-52), a polyol with a molecular weight of less than 500 g/mol, preferably being capable of forming a cationic group (page 2, lines 55-64), making also use of ethanolamine, N-methylethanolamine or N,N-diethanolamine (page 4, lines 1-4), the latter compounds being compounds F within the meaning of claim 1 of the main request. In view of the hydroxyl number of castor oil in the range of 160 to 168 mg/g, it could be calculated that the oil prepared in D2 with 85% by weight of castor oil acid had a hydroxyl number in the range of 120 mg/g to 230 mg/g. The use of a curing agent in accordance with present claim 1 was also disclosed on page 4, lines 15-16. Accordingly, claim 1 of the main request lacked novelty over D2. The same held true for dependent claims 2 to 5.

*Main request - inventive step*

(b) The closest prior art could be represented by the one-pack composition of the example on page 4 of D2. As to the problem solved over D2, the experimental evidence addressed in paragraph [0047] of the patent in suit was not suitable to



demonstrate any technical effect over D2, since D4 was not representative of the teaching of D2. Therefore, the problem solved over the closest prior art resided merely in the provision of further polyurethane coating compositions which were suitable for application on wood.

- (c) In the absence of any synergism arising from the combined effect of the distinguishing features over D2, the obviousness of each of those had to be assessed separately. D2 taught on page 4, lines 15-17 the use of polyfunctional isocyanates, which were implicitly non-blocked, since blocked cross-linkers were only used in specific situations, but not for coatings. In addition, the mere fact of accepting any inconvenience associated with the use of two-pack system could not contribute to an inventive step.
  
- (d) As to the selection of the hydroxyl number of the oil, it constituted an arbitrary and therefore obvious solution to the problem of providing further coating compositions. The appellant was surprised by respondent's argumentation made at the oral proceedings, that the skilled person would find difficult on the basis of the teaching of D2 to obtain oils having the hydroxyl number defined in claim 1. Although the exact hydroxyl number of the oil could not be predicted, the skilled person would nevertheless by varying the amount of castor oil obtain oils having an hydroxyl number in the range defined in claim 1 of the main request. The ratio of castor oil and soybean oil used for the preparation of polyester-oligomer-precursor 2 already led to a hydroxy number of 109 mg/g, which was close to the value of 120 mg/g defined in

operative claim 1. Finally, the use of chain extenders was taught in the first paragraph on page 4 of D2. Accordingly, all measures defined by the distinguishing features were obvious to the skilled person. Claim 1 lacked therefore an inventive step.

*Auxiliary requests 1 to 4*

- (e) Regarding inventive step, the same arguments submitted in relation to the main request equally applied to auxiliary requests 1 to 4.

*Admittance of auxiliary request 5*

- (f) The appellant had been surprised by the late complex technical submissions of the respondent in relation to the difficulty for the skilled person to prepare on the basis of the teaching of D2 oils having the hydroxyl number defined in claim 1 of the main request. In addition, the restriction of the hydroxyl number operated in claim 1 of auxiliary request 5 was based on the description of the patent in suit and was therefore not foreseeable. The new request raised new questions, which could not be answered at the oral proceedings without infringing the right to be heard. Therefore, auxiliary request 5 should not be admitted into the proceedings.

- X. As far as relevant to the present decision, the submissions of the respondent can be summarized as follows:

*Main request - novelty*

- (a) D2 did not disclose a polyurethane comprising building blocks derived from oils B as defined in claim 1 of the main request. D2 in particular did not disclose the use of castor oil, but only of a polyester oligomer which was the reaction product of castor oil with a fatty acid and glycerol, leading in examples 1 and 2 of that document to polyester oligomers having a hydroxyl number below the values required by operative claim 1. Even if, for the sake of the argument, one considered polyurethanes obtained from oils B to be disclosed in D2, the person skilled in the art would still need to operate a multiple selection of features within the teaching of D2 to arrive at the coating of operative claim 1. Accordingly, novelty over D2 was given.

*Main request - inventive step*

- (b) The closest prior art could be represented by the one-pack composition of the example on page 4 of D2.
- (c) The coating composition in accordance with claim 1 of the main request differed from the closest prior art in that the composition was a two-pack composition and in that the polyurethane comprised building blocks derived from an oil B having a hydroxyl number of from 120 mg/g to 230 mg/g, as well as building blocks derived from compound F.
- (d) The problem solved over the closest prior art was a more ambitious problem than the one formulated by the appellant, namely the provision of compositions bringing about improved mechanical and wood application properties. This was demonstrated by

the experimental tests mentioned in paragraph [0047] of the patent in suit. According to those tests the mechanical properties and wood wetting properties of the coating compositions in accordance with the patent in suit were superior to those obtained when using compositions of D4. The same advantages were provided over D2, since the coating compositions of D4 and D2 concerned one-pack compositions curing through oxidative crosslinking, i.e. without the use of an additional curing agent, which coating compositions were therefore expected to have similar properties.

- (e) Although it was known that the hydroxyl number of the polyester-oligomers (oils) of D2 would depend on the ratio of castor oil and soybean oil used for their synthesis, it would not have been obvious for the skilled person to prepare oils having a hydroxyl number as high as 120 mg/g. It was because the hydroxyl number of the prepared oils was not a relevant criterion according to the general teaching of D2, hydroxyl numbers being only mentioned in relation to the examples and the comparative example of D2 with values which were below the lower limit defined in operative claim 1. Comparing the properties achieved by the compositions tested in D2 in the light of the hydroxyl numbers of the oils described, it could not be concluded that increasing the hydroxyl number of the oil would provide any benefit, nor that the hydroxyl number of the oil would be an important criterion in D2.
  
- (f) In addition, obtaining an oil having targeted values for the hydroxyl number was not straightforward. The hydroxyl number could not be

predicted, since it did not only depend on the ratio of the oils undergoing transesterification, but also on the reaction time and the catalyst employed.

- (g) Since the coating compositions of D2 were drying oils requiring a large number of double bonds for oxidative curing, the skilled person would have rather increased the number of olefinic unsaturations in the polyester oligomers to be incorporated as building blocks in the polyurethane. Accordingly, starting from the example on page 4 of D2 the skilled person would have rather sought to increase the proportion of oil containing a larger amount of unsaturations, i.e. the proportion of soybean oil and as a result would have obtained oils having a lower hydroxyl number.
- (h) Accordingly, even if one did not accept that the problem solved over D2 was the provision of compositions bringing about improved mechanical and wood application properties, it would not be obvious for the skilled person to prepare a composition based on an oil having a hydroxyl number in the range of 120 mg/g to 230 mg/g. To arrive for the skilled person at the compositions in accordance with claim 1 of the main request was even less obvious, since it would have additionally required to operate a multiple selection within the teaching of D2 by using an amino alcohol (ethanolamine, N-methylethanolamine or N,N-diethanolamine) and an additional curing agent, when D2 concerned one-pack coating compositions. As could be understood from the prior art acknowledgement on page 2, line 15 to 24 of D2,

polyurethane resins undergoing autooxidative crosslinking such as those of D2 were merely seen as an alternative to two-pack compositions using a polyisocyanate crosslinker. That was also confirmed in D4 (paragraph [0002]). The statement on page 2, lines 15-18 of D2 regarding the limited applicability of two-pack coating compositions was not limited to the particular prior art described with this statement, but rather referred to a generally known problem associated with aqueous two-pack polyurethane coating compositions. Therefore, the mere statement on page 4, lines 15-16 of D2 would not have motivated the skilled person to alter the one-pack composition of the example on page 4 of D2. Therefore, the subject-matter of claim 1 involved an inventive step.

*Auxiliary requests 1 to 4*

- (i) The same arguments submitted in relation to inventive step of the subject-matter defined in claim 1 of the main request equally applied in relation to the compositions defined in claim 1 of auxiliary requests 1 to 4.

*Admittance of auxiliary request 5*

- (j) The relevance of the hydroxyl number had been recognized late and triggered by the Board's communication. The amendment consisting in the restriction of the range of hydroxyl numbers of the polyester building block was in line with the argumentation concerning this parameter presented at the oral proceedings. Moreover, the issue of the hydroxyl number had been already the subject of the written submissions. The amendment made did not

concern a new parameter and constituted the last chance for the respondent to obtain maintenance of the patent. Therefore, auxiliary request 5 should be admitted into the proceedings.

XI. The appellant requested that the decision under appeal be set aside and that the European patent No. 2 013 256 be revoked. It furthermore requested that documents D10 to D16 be admitted to the proceedings and that auxiliary request 5 filed during the oral proceedings before the Board not be admitted to the proceedings.

XII. The respondent requested that the appeal be dismissed, or alternatively that the decision under appeal be set aside and the patent be maintained on the basis of any of auxiliary requests 1 to 5, auxiliary requests 1 to 4 having already been filed during the opposition procedure (auxiliary requests 1 and 2 as filed on 27 February 2015, and auxiliary requests 3 and 4 as filed on 22 April 2015) and auxiliary request 5 having been filed during the oral proceedings before the Board.

## **Reasons for the Decision**

### *Main request*

#### *Novelty over D2*

1. 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. The objection that the claimed subject-matter lacks novelty over D2 is based on the enumeration of several isolated passages of that

document which relate to various possibilities encompassed by its teaching, but have not been shown to be necessarily read in combination by the skilled person. A pointer towards that combination of features taken from isolated passages of D2 was not indicated by the appellant.

2. Moreover, having regard to the feature of operative claim 1 that the dispersed polyurethane comprises a block derived from an oil B which among others is defined to have a hydroxyl number of from 120 mg/g to 230 mg/g, it is noted that the only disclosure relating to the hydroxyl number of the polyester oligomer (A) of D2 is to be found in the experimental part of that document describing the preliminary step of preparing polyester-oligomer-precursors 1 and 2 (page 4, lines 31-41).

Said oligomers are obtained by a transesterification reaction carried out on a mixture of castor (ricinus) oil (which comprises an hydroxyl group along the fatty acid chain) and soybean oil (having no hydroxyl group along the fatty acid chains). The transesterification reaction leads to a rearrangement of the fatty acid moieties between the two starting oils and as a consequence to a hydroxyl number of the obtained oil which is necessary below that of the castor oil. The two polyester-oligomer-precursors obtained in the examples exhibit hydroxyl numbers of 89 and 109 mg/g.

3. Accordingly, the polyurethane structure in accordance with the subject-matter of operative claim 1 differs from those disclosed in the examples of D2 at least in that it contains blocks derived from an ester having a higher hydroxyl number. The subject-matter of claim 1



and that of claims 2 to 5 which also incorporates the features of claim 1 is therefore novel over D2.

*Inventive step*

*Closest state of the art*

4. According to paragraph [0005] of the patent in suit, the object of the present invention is to provide aqueous polyurethane dispersions which exhibit superior wood-wetting properties, while at the same time retaining other favourable polyurethane properties in coatings prepared therefrom such as mechanical and chemical resistance.

4.1 According to D2, page 2, lines 7-10, it is advantageous to use polyurethane dispersions, especially for coating surfaces exposed to severe mechanical stress, since these dispersions combine the important properties of resistance to chemicals and mechanical stress. The aqueous polyurethane dispersions in accordance with D2 are used for the preparation of coating compositions for parquet (passage from page 5, line 56 to page 6, line 54) using in particular the polyurethane dispersion "PUR-Dispersion 1" described on page 4, lines 43-61. On this basis, as it appears from the contested decision, a suitable starting point for assessing inventive step was seen by the opposition division to be represented by D2, in particular the coating composition obtained with "PUR-Dispersion 1". This was not disputed by the parties. Having no reason to take a different view, the Board is satisfied that the coating composition of D2 prepared with "PUR-Dispersion 1" can be taken as the closest prior art.

4.2 The polyurethane of the aqueous polyurethane dispersion "PUR-Dispersion 1" comprises building blocks derived from the following educts:

- Desmodur® W (Bayer AG) and Desmodur® I (Bayer AG) which are polyfunctional isocyanates corresponding to component A of operative claim 1
- a "polyester-oligomer oil precursor 1"
- 1,6-hexanediol (component C according to operative claim 1)
- a poly(tetrahydrofuran) having a molecular weight of 2000 (optional component C' of operative claim 1) and
- dimethylolpropionic acid (component D according to operative claim 1).

The polyurethane is obtained by reaction of those compounds until a NCO content of 4,3% is obtained, followed by neutralisation with triethylamine (see also page 3, lines 65-66 of D2) and dispersion in water. Excess isocyanate groups are then reacted with hydrazine hydrate and ethylenediaamine (see also page 4, lines 1-3).

It is undisputed that the "polyester-oligomer-precursor 1" fulfills all requirements of operative claim 1 with the exception of the hydroxyl number, which is 89 mg/g as indicated in above section 2. In particular, at least 40% by weight of the fatty acids contained in this polyester-oligomer-precursor have at least one hydroxyl group as shown by the ratio of castor oil to soybean oil used for its preparation.

4.3 Accordingly, the coating compositions according to operative claim 1 differ from the coating composition of D2 using "PUR-Dispersion 1" in that:

(i) they are two-pack compositions wherein the curing agents are selected from the group consisting of non-blocked polyfunctional isocyanates **I** , polyaziridines **Z** , and carbodiimides **Y**,

(ii) the oil **B** used as a building block for the dispersed polyurethane U has a hydroxyl number of from 120 mg/g to 230 mg/g and

(iii) compounds **F** as defined in operative claim 1 is used as an additional building block of the dispersed polyurethane.

*Problem successfully solved*

5. The respondent regarded the problem solved over the closest prior art as the provision of coating compositions bringing about improved mechanical and wood application properties.
- 5.1 As to whether evidence has been provided that these alleged benefits resulted from the use of the distinguishing features identified in above section 4.3, the respondent relied on the results of the comparative tests mentioned in paragraph [0047] of the patent in suit. According to that paragraph [0047] a similar test to that indicated in paragraphs [0044] to [0046] of the patent in suit has been made with a polyurethane prepared according to EP 1 026 186 A1 (i.e. D4 in the present proceedings) used as comparative example. It was found that the paints 1 and 2 according to the patent in suit exhibited superior mechanical and wood wetting properties.
- 5.2 According to the established jurisprudence, if comparative tests are relied on 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 of the Boards of Appeal of the EPO, 8th edition, 2016, I.D.10.9).

5.3 The comparative test referred to by the respondent which is mentioned in paragraph [0047] of the patent in suit, however, is not further specified. In particular, the nature of the compounds making the coating or even the constituents of the dispersed polyurethane prepared according to D4 as a comparative example is not indicated, which makes it impossible to assess whether any effect identified in this test could be considered to result from any of the features distinguishing the compositions of operative claim 1 from the closest prior art. The same holds true with respect to the other comparative data mentioned in paragraphs [0044] to [0046] of the patent in suit, which are based on a comparison with a commercial paint whose compositions apart from being indicated to be a two-pack aqueous polyurethane coating composition are not further specified.

5.4 Consequently, it follows that the respondent has not presented any corroborating evidence rendering it credible that the purported technical effect of improving mechanical and wood application properties in comparison to the closest prior art is 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.

- 5.5 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 appellant, as the provision of further polyurethane coating compositions which are suitable for application on wood.

*Obviousness of the solution*

6. It remains to be decided whether the skilled person desiring to solve the problem identified above, would, in view of the closest prior art, possibly in combination with other prior art or with common general knowledge, have modified the disclosure of the closest prior art in such a way as to arrive at the claimed subject matter. In that respect, in the absence of any synergistic effect arising from the features distinguishing the claimed invention from the closest prior art, it has to be assessed separately whether each of said distinguishing features, taken alone, was obvious in the light of the prior art.

*Two-pack composition*

- 6.1 As to the possibility of preparing a two-pack composition, D2 teaches on page 4, lines 15-16 that it is possible to add cross-linking agents prior to application of the coating application, hydrophilic and hydrophobic polyisocyanate cross-linking agents being preferred for this purpose. This constitutes a clear suggestion for the skilled person that the polyurethane dispersions of claim 1 of D2, for example that exemplified on page 4, can be used in a two-pack composition also comprising a polyisocyanate cross-linking agent. Moreover, the selection of non-blocked polyisocyanates among known curing agents is a measure

well known in the art, especially for preparing two-pack coating compositions to be applied not long after the curing agent has been added, and is therefore obvious for the skilled person.

The passage of D2 on page 2, lines 17-18 cited by the opposition division, which allegedly would discourage the skilled person from making a two-pack composition when starting from the teaching of D2, concerns the description of a prior art document, but does not concern the teaching of D2 in itself. That passage therefore cannot in the Board's view constitute any indication for the skilled person to go against the unmistakable suggestion provided on page 4, lines 15-16 of D2 to prepare two-pack compositions with the polyurethane dispersions taught in that document.

The respondent's argument that the skilled person would have assumed that he would be faced with the same applicability problems of two-pack coating compositions referred to on page 2, lines 17/18 of that document, namely that the application of two-components systems is comparatively complex and their range of applications limited, especially in the case of manual application or application by an artisan, is also not convincing, since it was not shown, let alone argued, that said mentioned problem has been overcome when using the two-pack coating composition of operative claim 1. Given the established principle that the answer to the question as to what a person skilled in the art would do depends on the result he wished to obtain (T 939/92, OJ EPO 1996, 309; Reasons for the decision, point 2.5.3), the use of a two-pack coating composition is considered by the skilled person as a useful and obvious measure in view of the fact that, in the present case, the skilled person is deemed to be

merely seeking to provide further polyurethane coating compositions which are suitable for application on wood, i.e. regardless of their ability to be applied manually or by an artisan.

*Oils B*

- 6.2 The polyester-oligomer-precursors 1 and 2 disclosed in the experimental part of D2 are prepared by a transesterification reaction of a mixture of castor and soybean oils in a weight proportion of 2:1 in the presence of dibutyltin oxide or lithium hydroxide as transesterification catalyst, the polyester oligomers obtained exhibiting hydroxyl numbers of 89 and 109 mg KOH/g, respectively. Apart from the type of transesterification catalyst used, the synthesis conditions are identical. Both represent suitable polyester oligomers to be incorporated as building blocks of the polyurethane as shown by the preparation of the exemplified dispersions "PUR-Dispersion" 1 to 3 (pages 4 and 5 of D2).
- 6.2.1 Having regard to the hydroxyl number of castor oil which undisputedly is in the range of 160 to 168 mg/g, it can be seen that the hydroxyl number of polyester-oligomer-precursor 2 prepared in D2 corresponds to the expected value, which is 2/3 of the hydroxyl number of the castor oil, namely a value ranging from 107 to 112, indicating the efficiency of the catalyst used for preparing polyester-oligomer-precursor 2.
- 6.2.2 According to claim 1 and to page 2, lines 46-53 of D2, the polyester oligomer is obtainable from
- AI) 30-85%, preferably 50-70%, of castor oil fatty acid,

AII) 10-60%, preferably 25-35%, of one or more carboxylic acids having 8 to 30 C atoms and 0 to 4 C=C double bonds and

AIII) 3-20%, preferably 5-15%, of one or more alcohols with an average functionality of 2,5 to 3,5.

It was not disputed that this definition of the polyester oligomer in D2 suggests that the weight proportions of castor and soybean oils can be broadly varied. By way of illustration, it can be calculated for example based on the content of glycerin in these oils (about 10 wt.%) and the amount of castor oil fatty acid contained in castor oil (77 to 83 wt.% indicated by the appellant based on D3, which was not disputed) that a 90:10 proportion by weight of castor oil to soybean oil would approximately correspond to a polyester oligomer obtainable from 65% of castor oil fatty acid AI), 25 % of other fatty acids AII) and 10% by weight of glycerine AIII), corresponding to amounts which are in the preferred ranges disclosed in D2.

Using such mixture of castor oil and soybean oil in a weight ratio of 90:10 would lead under suitable transesterification conditions to a maximum value of the hydroxyl number of 144 to 151 (based on the approximation that the the hydroxyl number of the resin would be about 9/10 of that of the castor oil). In other words, increasing the proportion of castor oil used in the examples of D2 will contribute to increase the hydroxyl number of the polyester-oligomer-precursors to the level defined in operative claim 1.

It is also noted for the sake of completeness that the fatty acids **B2** used for the preparation of polyester-oligomer-precursors 1 and 2 of D2 already comprise at least 40% by weight of a castor oil (fatty acid **B21**



within the meaning of operative claim 1), so that increasing the proportion of castor oil necessarily leads to a polyester oligomer meeting that requirement.

Moreover, since the result the skilled person wished to obtain was the mere provision of further polyurethane coating compositions which are suitable for applying on wood, then all measures recommended in D2 for providing polyurethane coating compositions which are suitable for application on wood would be equally suitable and suggested. In addition, no inventive skill needs to be exercised in selecting for this purpose, for instance, a higher proportion of castor oil acid within the teaching of D2, while keeping the other conditions recommended for the synthesis of the polyester-oligomer-precursors described in the experimental part of D2. Consequently, acting routinely, the skilled person would arrive at the feature "oils **B**" defined in operative claim 1 without the exercise of inventive skills.

- 6.2.3 The fact that the hydroxyl number was not a relevant criterion according to the teaching of D2 as argued by the respondent, is not decisive, since arriving at polyester oligomers B meeting the hydroxyl number requirement of claim 1 is as shown above the mere result of an obvious choice concerning the proportion of oils used for the synthesis of said polyester oligomers. The argument that obtaining targeted hydroxyl number was not straightforward, as it did not only depend on the ratio of the oils undergoing transesterification, but also on the reaction time and the catalyst employed, also fails to convince. Being instructed in D2 to prepare the polyester-oligomers by transesterification, the skilled person would in an obvious manner when changing the proportion of castor

and soybean oils take the transesterification catalyst successfully used for the preparation of polyester-oligomers 1 and 2, allowing if necessary sufficient time for the transesterification reaction to take place.

*Compounds F*

6.3 D2 teaches on page 4, lines 1-4 that excess isocyanate groups are reacted with polyfunctional isocyanate-reactive compounds providing chain extension. To this end, water or polyamines are preferably used, particularly preferably di- and triamines and hydrazine. Termination with a monoamine, such as for example diethylamine, dibutylamine, ethanolamine, N-methylethanolamine or N,N-diethanolamine is also possible according to that passage. Accordingly, the skilled person faced with the problem of providing further polyurethane coating compositions which are suitable for application on wood would find it obvious to use ethanolamine, N-methylethanolamine and N,N-diethanolamine, i.e. a compound F within the meaning of operative claim 1 (see paragraph [0025] of the patent in suit) in addition to or in replacement of hydrazine hydrate and ethylenediamine used for the preparation of PUR Dispersion 1.

6.4 Consequently, the skilled person faced with the problem of providing further polyurethane coating compositions which are suitable for application on wood would have arrived in an obvious manner in view of the teaching of D2 alone at the three modifications of the closest prior art identified in above point 4.3 and therefore at compositions which fall within the ambit of operative claim 1. It is therefore concluded that the

subject-matter of claim 1 of the main request lacks an inventive step.

6.5 The main request is therefore not allowable.

*Auxiliary requests 1 to 4*

7. The parties stated that their inventive step arguments equally applied to claim 1 of auxiliary requests 1 to 4. Under those circumstances the Board has no reason to conclude that the amendments introduced into auxiliary requests 1 to 4 result in the introduction of additional distinguishing features and/or a different formulation of the problem solved over the closest prior art.

7.1 More specifically, the amendment introduced into claim 1 of auxiliary request 1, namely the restriction of the curing agent to non-blocked polyfunctional isocyanates, does not change the conclusion in respect of the main request, since the use of said curing agent is obvious as indicated in above section 6.1.

7.2 As to the amendment introduced into auxiliary request 2, namely that the fatty acid **B2** comprises at least one olefinic unsaturation, this amendment does not result in any additional distinguishing feature over the closest prior art which describes the use of castor oil, which also is an unsaturated fatty acid. As regards auxiliary requests 3 and 4 their claim 1 differs from claim 1 of the main request in that process steps defining the preparation of the aqueously dispersed polyurethane **U** have been inserted. It has not been shown, let alone argued, that said process features would result in structural feature(s) of the claimed composition which constitute additional

distinguishing feature(s) over D2. Accordingly, the additional amendments contained in claim 1 of auxiliary requests 2 to 4 cannot overcome the negative finding on inventive step in respect of claim 1 of the main request.

- 7.3 Consequently, none of the auxiliary requests 1 to 4 is allowable.

*Auxiliary request 5 - admittance*

8. The admittance to the proceedings of auxiliary request 5 submitted at the beginning of the oral proceedings underlies the stipulations of Articles 13(1) and 13(3) RPBA. That auxiliary request corresponds to the main request wherein claim 1 has been modified by amending the values of the hydroxyl number of oils **B** to be in the range of from 140 mg/g to 190 mg/g, instead of that from 120 mg/g to 230 mg/g.

- 8.1 The whole discussion in the appeal proceedings up to the oral proceedings before the Board was focused only on the obviousness of using a two-pack coating composition when starting from D2 as closest prior art. The respondent's line of defense that the skilled person based on the teaching of D2 would not arrive in an obvious way at preparing oils **B** with a hydroxyl number within the claimed range was put forward for the first time at the oral proceedings. In view of the fact that the appellant had already argued in its statement setting out the grounds of appeal (see passage in point 6.1.3.2, starting with the 4th paragraph on page 14), that D2 disclosed oils having the hydroxyl number required by claim 1, there was not justification for the respondent to wait until the oral proceedings to argue that preparing oils having the hydroxyl numbers

defined in claim 1 of the main request was not a trivial measure for the skilled person in the light of D2, let alone to submit auxiliary request 5 which gave more strength to the respondent's new line of defense. The allegation that the relevance of the hydroxyl number had been triggered by the Board's communication therefore fails to convince and the Board finds no justification for the late filing of auxiliary request 5.

8.2 Whereas the question raised in relation to the minimum hydroxyl number defined in the main request and auxiliary requests 1 to 4 could be reasonably addressed during the oral proceedings (see in particular section 6.2.2 above), it became evident that the appellant could not adequately react to the new situation arising from the filing of auxiliary request 5 without adjournment of the oral proceedings, since it would have required at least further clarification and investigation in order to assess whether it was credible that a skilled person following the teaching of D2 could have prepared an oil B having a hydroxyl number with the new range defined in claim 1 of auxiliary request 5. The fact that the filing of auxiliary request 5 constituted the last chance for the respondent to obtain maintenance of the patent, when there was no other justification for the late filling of this request, does not outweigh the need for fair proceedings and procedural economy.

8.3 On this basis, auxiliary request 5 is not admitted into the proceedings under Article 13(3) RPBA.

9. Documents D10 to D16 were cited in support of the appellant's objection that the claimed subject-matter lacked an inventive step. Having regard to the above

negative finding in respect of inventive step, which is not based on documents D10 to D16, there is no need for the Board to address the admittance of these documents 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:



L. Malécot-Grob

D. Semino

Decision electronically authenticated