

**Internal distribution code:**

- (A) [ - ] Publication in OJ
- (B) [ - ] To Chairmen and Members
- (C) [ - ] To Chairmen
- (D) [ X ] No distribution

**Datasheet for the decision  
of 7 August 2020**

**Case Number:** T 0206/17 - 3.3.03

**Application Number:** 12183144.0

**Publication Number:** 2546308

**IPC:** C08K5/16, C08L75/08,  
C09J175/08, C08L101/10,  
C09J201/10, C08K5/57, C09K3/10

**Language of the proceedings:** EN

**Title of invention:**  
Curable composition

**Patent Proprietor:**  
KANEKA CORPORATION

**Opponent:**  
Henkel AG & Co. KGaA

**Relevant legal provisions:**  
EPC Art. 54, 56  
RPBA Art. 12(4), 13(1), 13(3)

**Keyword:**

Novelty - (yes)

Inventive step (no)- effect not made credible within the whole scope of claim - obvious alternative

Auxiliary requests not properly substantiated - not be taken into account

**Decisions cited:**

T 0035/85, T 0939/92, T 1732/10



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 0206/17 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 7 August 2020**

**Appellant:** Henkel AG & Co. KGaA  
(Opponent) Henkelstrasse 67  
40589 Düsseldorf (DE)

**Representative:** Viering, Jentschura & Partner mbB  
Patent- und Rechtsanwälte  
Hamborner Straße 53  
40472 Düsseldorf (DE)

**Respondent:** KANEKA CORPORATION  
(Patent Proprietor) 2-3-18, Nakanoshima,  
Kita-ku  
Osaka (JP)

**Representative:** Cabinet Beau de Loménie  
158, rue de l'Université  
75340 Paris Cedex 07 (FR)

**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
9 December 2016 concerning maintenance of the  
European Patent No. 2546308 in amended form.**

**Composition of the Board:**

**Chairman** M. C. Gordon  
**Members:** F. Rousseau  
C. Brandt

## Summary of Facts and Submissions

I. The appeal lies against the interlocutory decision of the opposition division posted on 9 December 2016 according to which European patent No. 2 546 308 as amended according to the main request submitted with letter of 19 February 2016 met the requirements of the EPC. The patent in suit is based on European patent application 12 183 144.0, which is a divisional application of the earlier European patent application 05 806 253.0.

II. Claim 1 of the main request submitted with letter of 19 February 2016 read as follows:

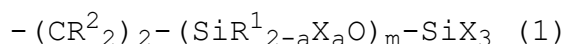
"1. A tin-free curable composition, comprising:

(A) one or more organic polymers having a reactive-silicon-containing group,

and

(B) a silanol condensation catalyst,

wherein at least one part of the reactive-silicon-containing group(s) of the organic polymer(s) (A) is represented by the following general formula (1):



wherein R<sup>1</sup>s each independently represent a substituted or unsubstituted hydrocarbon group having 1 to 20 carbon atoms, or a triorganosiloxy group represented by (R')<sub>3</sub>SiO- wherein R's are each a substituted or unsubstituted hydrocarbon group having 1 to 20 carbon atoms, and R's, the number of which is 3, may be the same or different, R<sup>2</sup>s are each independently a hydrogen atom, or a substituted or unsubstituted hydrocarbon group having 1 to 10 carbon atoms, Xs are each independently a hydroxyl group, or a hydrolyzable

group, a is 0, 1 or 2, and m is 0 or an integer of 1 to 19, and  
the silanol condensation catalyst (B) consists of amine compound(s) (B1) and a carboxylic acid (B2), and when the mol number of the amine compound(s) is regarded as 1, the ratio by mol of the total amount of the carboxylic acid(s) to the amount of the amine compound(s) is 0.1 or less),  
wherein the ratio of the organic polymer having the group represented by the general formula (1) in the organic polymer(s) of the component (A) is 10% or more by weight, and  
a silane coupling agent (C) is contained in an amount of 0.01 to 20 parts by weight for 100 parts by weight of the organic polymer(s) (A)."

III. In addition to the above main request the patent proprietor had submitted before the opposition division a first auxiliary request filed with letter of 19 February 2016 and second to fifth auxiliary requests, all submitted with letter of 15 September 2016, whose claims 1 contained the following amendments:

*First auxiliary request*

In comparison to claim 1 of the main request, the silane coupling agent (C) was defined to be an aminosilane.

*Second auxiliary request*

In comparison to claim 1 of the first auxiliary request the amount of aminosilane coupling agent was restricted to an amount of 1 to 7 parts by weight for 100 parts by weight of the organic polymer(s) (A).

*Third auxiliary request*

In comparison to claim 1 of the second auxiliary request, claim 1 of the third auxiliary request defined that the one or more organic polymers having a reactive-silicon-containing group was a trimethoxysilyl-group-terminated polyoxyalkylene polymer.

*Fourth auxiliary request*

In comparison to claim 1 of the third auxiliary request, claim 1 of the fourth auxiliary request defined compound(s) (B1) as selected from DBU and DBN and a carboxylic acid (B2) selected from versatic acid, 2-ethylhexanoic acid, octanoic acid, oleic acid, naphthenic acid, 2,2-dimethyloctanoic acid, 2-ethyl-2,5-dimethyl hexanoic acid and neodecanoic acid.

*Fifth auxiliary request*

In comparison to claim 1 of the fourth auxiliary request, claim 1 of the fifth auxiliary request defined the amino silane coupling agent (C) to have a trimethoxysilyl group and an amino group.

IV. The following evidence was submitted *inter alia* before the opposition division:

D1: Machine translation of JP 08-041358

D1': translation into English of the experimental part of JP 08-041358 submitted by the patent proprietor with letter of 15 September 2016 (labelled "Annex 2")

D1': translation into German of the experimental part of JP 08-041358 submitted by the opponent with letter of 22 September 2016

D2: EP 1 285 946 A1

D7: EP 1 445 287 A1

D8: Experimental data labelled "Annex 1" submitted by the patent proprietor with letter of 15 September 2016.

- V. According to the contested decision, D1', D7 and D8 were admitted into the proceedings. The opposition division also held that the claims met the requirements of Articles 123(2) and 123(3) EPC and that the amendments introduced did not result in a lack of clarity. Sufficiency of disclosure was acknowledged, the objections raised being in fact objections of lack of clarity. The objection that the claimed subject-matter lacked novelty in view of D1 resulted from a multiple selection of elements described in D1, which elements were however not "*disclosed in an individualised form*" in that document. Novelty over D1 was therefore acknowledged. Concerning inventive step, the closest prior art was represented by the disclosure of Example 2 of D1. The subject-matter of claim 1 differed from Example 2 of D1 in the structure of polymer (A), the ratio by mole carboxylic acid (B2)/ amine (B1) of 0.1 or less and in the use of a silane coupling agent (C). The experimental evidence relied on by the proprietor was not based on the teaching of the D1, let alone on Example 2 thereof. It was not suitable to demonstrate an advantage over the closest prior art which advantage according to established case law should be achievable over the whole scope claimed. In the absence of reliable experimental data, it was also not possible to estimate the properties of the claimed curable compositions in terms of curability and adhesiveness. Therefore, the technical problem

successfully solved over the closest prior art could be only formulated as the provision of an alternative tin-free curable composition. D1 did not suggest to reduce the ratio by mole of carboxylic acid/amine to 0.1 or less, but rather to increase it in order to increase the curing rate. In addition, none of the documents cited suggested the combination of compounds claimed. An inventive step was therefore acknowledged.

VI. The opponent (appellant) lodged an appeal against the above decision. The appellant submitted with the statement setting out the grounds of appeal the following document (designated "D8" by the opponent and renumbered by the Board):

D9: US 2004/0198885 A1.

VII. The patent proprietor (respondent) replied to the appeal.

VIII. In preparation of oral proceedings foreseen for 25 August 2020, the Board issued a communication dated 21 February 2020 including a preliminary opinion *inter alia* on inventive step starting from the disclosure of D1 as the closest prior art. The Board also indicated that the first to fifth auxiliary requests had not been substantiated with the consequence that they could not be considered to have been filed until such substantiation would have been provided.

IX. With letter of 3 June 2020 the respondent made additional submissions concerning the question of inventive step. The respondent informed the Board with this letter that it would not be represented at the oral proceedings. The respondent also requested that a



decision be taken based on the written content of the file.

X. Oral proceedings were thereafter cancelled by the Board.

XI. The appellant's submissions, insofar as they are pertinent, may be derived from the reasons for the decision below. They are essentially as follows:

(a) D9 was to be admitted into the proceedings.

(b) Claim 1 of the main request lacked sufficiency of disclosure.

(c) Claim 1 of the main request was anticipated by D9 and D1.

(d) Claim 1 of the main request lacked an inventive step over D1.

XII. The respondent's submissions, in so far as they are pertinent, may be derived from the reasons for the decision below. They are essentially as follows:

(a) D9 was not to be admitted into the proceedings.

(b) The requirements of sufficiency of disclosure were met.

(c) The subject-matter of the main request was novel and inventive over D1.

(d) Claim 1 of the main request lacked an inventive step over D1.

(e) The response to the appeal explained how the amendments in the auxiliary requests overcame the objection for lack of inventive step raised in respect to the main respect.

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

XIV. The respondent requested that the appeal be dismissed, or alternatively that the decision under appeal be set aside and that the patent be maintained in amended form according to the first auxiliary request filed with letter of 19 February 2016, or alternatively on the basis of any of the second to fifth auxiliary requests, all submitted with letter of 15 September 2016.

## **Reasons for the Decision**

### *Main request*

#### *Novelty*

1. The general principle consistently applied by the Boards of Appeal for a finding of lack of novelty is that there has to 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 D1 is based on the identification and collocation of several isolated passages of that document which relate to various possibilities encompassed by its teaching (choice of a trifunctional silane end group, a ratio of carboxylic acid to amine in the lower part of the range

disclosed in D1 and a silane coupling agent). However, the appellant has not demonstrated that D1 provides a disclosure of these features in combination or that such combination would be understood by the skilled person when reading the document. Consequently, novelty of the subject-matter defined in the main request over D1 is to be acknowledged (Article 54(2) EPC). In view of the finding below concerning the separate objection that claim 1 lacks an inventive step over D1 it is appropriate to give a more detailed reasoning concerning novelty over that document.

*Inventive step*

*Closest state of the art*

2. According to paragraph [0011] of the patent in suit, an object of the present invention is to provide a curable composition which is made mainly of a polymer having a reactive-silicon-containing group, and gives good curability, adhesiveness and storage stability by use of a catalyst other than organic tin catalysts. The opinion of the opposition division that the tin free curable composition described in Example 2 of D1 represented the closest prior art and starting point for assessing inventive step was not disputed by the parties. The Board has no reason to take a different view.

Having regard to translations D1' and D1'' of the experimental part of D1, i.e. its paragraphs [0048] to [0058], Example 2 is a repetition of Example 1 of that document in which the ratio by mole of 2-ethylhexanoic acid to laurylamine is 0.5. In view of paragraph [0054] describing Example 1, the composition of Example 2 is tin-free and comprises apart from said 2-ethylhexanoic

acid and laurylamine, a colloidal calcium carbonate, process oil, a hindered amine antiaging agent, sodium sulfate hydrate as a crosslinking agent and the polymer obtained in Production Example 1 which is described in paragraph [0049] to be an isobutylene oligomer having two  $\text{Me}(\text{MeO})_2\text{Si}(\text{CH}_2)_8$ - terminal groups. It is undisputed that the composition of operative claim 1 differs from the closest prior art in

- the structure of the reactive-silicon-containing group of polymer (A) which is represented by  $-(\text{CR}^2_2)_2-(\text{SiR}^1_{2-a}\text{X}_a\text{O})_m-\text{SiX}_3$  (1) wherein in Xs are each independently a hydroxyl group of a hydrolyzable group (it is referred to claim 1 for the meaning of  $\text{R}^1, \text{R}^2, a$  and  $m$ ).

- a ratio by mole of the total amount of carboxylic acid (B2) to the amount of amine compound (A1) of 0.1 or less

- the additional use of a silane coupling agent (C) in an amount of 0.10 to 20 pbw for 100 pbw of the organic polymer(s) (A).

*Problem successfully solved*

3. Having regard to the disclosure of the closest prior art, the respondent/patent proprietor and the appellant/opponent take differing positions as to which problem can be considered to be successfully solved by the subject-matter of operative claim 1. Relying on the experimental results described in the patent in suit and D8, the respondent/patent proprietor argues that the technical problem solved by the subject-matter of claim 1 with respect to the closest prior art is the provision of a composition having excellent curability

at preserved adhesiveness, the distinguishing features over the closest prior art being argued to act in synergy, whereas the appellant/opponent submits that the problem solved by the claimed subject-matter is to provide alternative formulations, in line with the finding of the opposition division.

- 3.1 Considering that the problem to be defined is that solved over or in comparison with the closest prior art, it is questionable whether the formulation of the problem submitted by the respondent seemingly defined in absolute terms as far as curability is concerned, i.e. without reference to the corresponding property obtained in the closest prior art, and on the vague terms "excellent" and "preserved", provides the basis for an objective comparison with the closest prior art as required for an assessment of inventive step. The question to be answered is rather whether any technical benefit or improvement in respect of the properties addressed by the respondent is achieved in comparison to the closest prior art.
- 3.2 In agreement with the finding of the opposition division (section 6.3.2 of the Reasons for the decision) no experimental data based on the teaching of D1, let alone on the disclosure of Example 2 of D1 using a particular amine (laurylamine) and a particular carboxylic acid (2-ethylhexanoic acid), have been submitted in order to demonstrate the achievement of said alleged benefits. The only experimental evidence concerning a composition falling within the ambit of present claim 1 is Example 22 of the patent in suit using a trimethoxy-silyl-group-terminated polyoxypropylene polymer as polymer (A1), 1,8-diazabicyclo[5,4,0]undecene-7 (DUB) as amine compound (B1), neodacanoic acid as compound (B2) and  $\gamma$ -aminopropyl-

trimethoxysilane as compound (C). There is therefore no further direct experimental evidence based on compositions falling within the ambit of operative claim 1, in particular examples showing the use of different amine compounds (B1) or carboxylic acids (B2).

- 3.3 In the absence of direct evidence that the compositions of operative claim 1 exhibited the alleged benefits over the composition of Example 2 of D1 the respondent relied on experimental evidence which was intended to show that the features distinguishing the compositions of claim 1 from that of Example 2 of D1, i.e. the features defined in above point 2, resulted in the technical benefits mentioned in above point 3.1. In accordance with the established case law, the patent proprietor may discharge its onus of proof by voluntarily submitting comparative tests with variants of the closest state of the art making identical the features common with the invention in order to have a variant lying closer to the invention so that the advantageous effect attributable to the distinguishing features of the invention is thereby more clearly demonstrated (Case Law of the Boards of Appeal of the European Patent Office, 9th edition, 2019, I.D.10.9, in particular T 35/85, point 4 of the reasons). Furthermore, considering that the alleged technical benefits which are meant to be demonstrated by the comparative test are alleged to be achieved over the closest prior art, it needs also in the Board's opinion to be shown whether a credible causal link between a distinguishing feature over the closest prior art and a technical benefit demonstrated in the framework of a comparative test which is a variant of the closest prior art, can be expected to take place also in the framework of the closest prior art despite the

existence of differences vis-à-vis the reference example of the comparative test. Moreover, as pointed out by the opposition division in the contested decision, with reference to decision T 0939/92 (OJ EPO 1996, 309) it has to be considered whether the technical advantages invoked have been credibly shown to occur over the whole area claimed such that these advantages can be relied upon for the formulation of the problem solved over the closest prior art.

In order to assess the relationship between the distinguishing features over the closest prior art and the properties which the respondent sees as being improved as resulting from their use, the experimental data referred to by the respondent are analysed in the following manner:

*Use of trialkoxysilyl terminated polymer (A)*

- 3.4 The respondent is of the opinion that trialkoxysilyl terminated polymers (A) contribute to enhanced curability (section IV.4.2.2 of the rejoinder, first paragraph), reference being made to the data in table 1 of the disputed patent. Those data show that the presence of three hydrolyzable groups instead of two hydrolyzable groups leads to improved curability expressed in terms of the skin formation time. This was not disputed by the appellant and merely corresponds to what the skilled person would expect, namely that the curability of a resin is enhanced by increasing the number of groups allowing cross-linking. Accordingly, it appears credible that the first distinguishing feature alone would result in an enhanced curability, even in the context of Example 2 of D1 and therefore would contribute to an improved curability regardless of the condensation catalyst consisting of the amine

compound(s) (B1) and the carboxylic acid (B2). It is also noted that these data do not provide any information on the influence of using trialkoxysilyl terminated polymer on the adhesiveness of the cured composition.

*Use of a ratio by mole of the total amount of carboxylic acid (B2) to the amount of amine compound (B1) of 0.1 or less*

3.5 In the second paragraph of section IV.4.2.2 of the reply to the statement of grounds the respondent argues that the use of a carboxylic acid (B2) contributes to enhanced curability, as was shown in table 4 of the patent and also in D1. Independently from the question whether the data in table 4 demonstrate such an effect, the mere presence of the carboxylic acid in the curable composition does not appear to be relevant for assessing the problem successfully solved over the closest prior art, since it does not constitute a distinguishing feature over the curable composition of Example 2 of D1. It is rather the influence of the amount of such compound in relation to the amount of amine compound which matters, i.e. rather decreasing the molar ratio of total amount of carboxylic acid (B2) to the amount of amine compound (B1) from 0.5 in the composition of the closest prior art to a value of 0.1 or less which needs to be assessed.

3.6 The respondent addresses in section IV.4.2.3 of the reply to the statement of grounds a "curability and adhesiveness balancing effect" resulting from the molar ratio of the amount of (B2) to the amount of (B1). For this purpose it is referred to a comparison between Comparative Examples 15, 16 and 21 and Example 22.

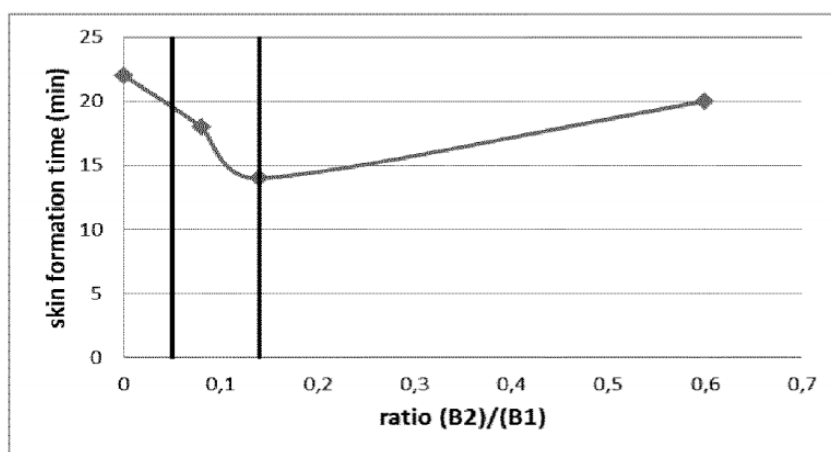


3.6.1 The respondent's submissions are also based on the argument in its letter of 3 June 2020 that claim 1 defines a zone ("slice") of an optimum curability range which excludes molar ratios  $(B2)/(B1)$  above that of Comparative Example 15 which argument is based on a particular interpretation of the molar ratio  $(B2)$  to  $(B1)$  defined in claim 1. The respondent argues that a  $(B2)/(B1)$  ratio of 0.14 as used in Comparative Example 15 would mean a ratio of 0.1 as in view of part G-I 8.1 of the current Guidelines for Examination, according to which ranges of values should be interpreted taking into account that the last decimal place of a numerical value indicates its degree of accuracy and the rounding-off convention to the last decimal is applied. As far as the lower value of the  $(B2)/(B1)$  ratio is concerned the respondent argues that the wording "the silanol condensation catalyst (B) consists of amine compound(s) (B1) and a carboxylic acid (B2)" in the context of a tin-free curable composition implies that catalytic silanol condensation function is actually present in the claimed composition due to component (B) and that both components  $(B1)$  and  $(B2)$  contribute to that activity. This would inherently require a sufficient high amount of the carboxylic acid  $(B2)$  and related sufficiency high molar ratio  $(B2)/(B1)$  for allowing the amine compound(s)  $(B1)$  to contribute with a relevant extent to the catalytic silanol condensation function, which renders the tin-free composition curable.

3.6.2 The respondent's submissions concerning the interpretation of the molar ratio  $(B2)$  to  $(B1)$  defined in claim 1 is illustrated by the hereunder represented Table and graph presented in sections I.2 and I.3 respectively of the respondent's letter of 3 June 2020.

ratio (B2)/(B1)	Example		Comparative Example	
	21	22	15	16
	0.0 (0.00)	<b>0.1</b> (0.08)	<b>0.1</b> (0.14)	0.6 (0.60)

The Board notes that the indication in the above table that Example 21 is an example of the present invention is an obvious error by the respondent as operative claim 1 requires the presence of carboxylic acid, in line with the respondent's arguments mentioned above and the unambiguous indication in Table 6 of the specification that Example 21 is a comparative example. The Board notes further that the ratios indicated by the respondent in this table are by weight, not by mole. Taking into account the molecular weights of the carboxylic acid and amine used in these examples, namely neodecanoic acid (MW of 172,27 g) and 1,8-diazabicyclo[5,4,0]undecene-7 (DUB) (MW of 152,24 g), the (B2)/(B1) molar ratios used in Example 22 is of 0.071 and those used in Comparative Examples 15 and 16 are 0.124 and 0.530, respectively.



3.6.3 The section of the Guidelines referred to by the respondent concerns numerical values relating to measurements which are subject to errors placing limits on their accuracy. However, in the present case the

(B2)/(B1) value is not a measured value for which accuracy of the measurement has to be taken into account, but a mere ratio between two amounts, even if each of these amounts of B1 and B2 can be considered to have been measured, e.g. based on weight or volume measurements, when preparing the claimed composition. There is therefore no reason to consider that this mathematical ratio should be subjected to rounding. Moreover, Comparative Example 15 addressed by the respondent is designated in the patent in suit as a comparative Example. The (B2)/(B1) molar ratio which can be computed on the basis of the respective amounts of B2 and B1 of 0.35 and 2.5 parts by weight to be 0.124 is the sole reason why that composition is marked as comparative, as it otherwise meets all requirements of claim 1 as granted, in line with paragraph [0108] specifying that in Comparative Examples 15 and 16 the adhesiveness was lowered by the the addition of the carboxylic acid, i.e. implicitly above the limit of 0.1 defined in claim 1 as granted. Under these circumstances there is no reason to interpret claim 1 in a different manner than the clear indication in claim 1, that the ratio should have an unrounded value of 0.1 or less.

- 3.6.4 Concerning the minimum amount for the molar ratio of (B2) to (B1), the Board agrees with the respondent's argument that the term "curable" in operative claim 1 implies that both components (B1) and (B2) are present in an amount allowing a catalytic silanol condensation reaction. It does not, however, necessarily imply having regard to the following considerations a minimum molar ratio of (B2) and (B1) as argued by the respondent. Whereas as shown in the above graph the use of a carboxylic acid influences the skin formation time, taken as an indicator for the curability, its

presence is not necessary to provide a tin-free curable composition as demonstrated by Comparative Example 21 in which the sole presence of a specific amount of an amine (B1) is sufficient to provide a cured product. This is confirmed in paragraph [0092] of the specification according to which a minimum amount of amine compound (B1) is necessary, paragraph [0093] specifying that when a carboxylic acid (B2) is used together with an amine compound (B1), curability of the obtained curable composition can be improved. However, as specified in paragraph [0093] the molar ratio of (B2) to (B1) should be 0.1 or less in view of the negative impact of the carboxylic acid (B2) on the adhesiveness of the composition, in line with that requirement in operative claim 1. Accordingly, whereas for low amounts of amines (B1) there might exist a limited number of cases for which a minimum amount of carboxylic acid (B2) and therefore a minimum molar ratio of (B2)/(B1) would be required to obtain a curable composition, there is no reason to consider that claim 1 would inherently and generally require a sufficient high amount of the carboxylic acid (B2) and related sufficient high molar ratio (B2)/(B1).

3.7 The compositions of Comparative Examples 15, 16 and 21 and Example 22 referred to by the respondent vary only in the use of various amounts of carboxylic acid (B2), resulting in various (B2) to (B1) molar ratios meaning that the nature of the comparison is such that the variation of the skin formation time shown in the above graph is convincingly shown to have its origin in the (B2)/(B1) molar ratio. This graph shows that for this specific system which is based on neodecanoic acid and DBU, as components (B2) and (B1), respectively, a composition can be effectively cured with the amine as sole curing catalyst, whereas the addition of

carboxylic acid increases the curability even with a (B2)/(B1) molar ratio outside of the range defined in operative claim 1, e.g. for a molar ratio of 0.5 as used in Example 2 of D1. Accordingly, even if to the benefit of the respondent, the result shown with the comparative data referred to by the respondent could be considered to be applicable to the system used in Example 2 of D1, it could not be concluded that as a result of using a molar ratio (B2)/(B1) of 0.1 or less instead of 0.5 one would necessarily obtain over the full scope of the range defined for that ratio, in particular for extremely low ratios covered by present claim 1, a higher or even equivalent curability.

3.8 Moreover, as illustrated in paragraphs [0085] and [0094] of the specification, operative claim 1 covers the use of large groups of amines and carboxylic acid, respectively. In the absence of any technical evidence or supplementary technical explanations there is no reason for the Board to consider that any possible pair of amine compound(s) (B1) and carboxylic acid (B2) listed in these paragraphs when used in a molar ratio of 0.1 or less would provide an improved or even equivalent curability in comparison to 2-ethylhexanoic acid and laurylamine used in a molar ratio of 0.5.

3.9 Concerning adhesiveness of the cured compositions, Comparative Examples 15, 16 and 21 and Example 22 show that in the context of those experiments it was convincingly shown that adhesiveness of the cured composition on a flexible PVC coating on steel plate and acrylic resin plate is improved by using a molar ratio (B2)/(B1) within the range defined in claim 1. Whether a similar result can be expected to arise when using such molar ratio of 0.1 or less in the specific context of Example 2 of D1, or generally for any pair

of amine compound(s) (B1) and carboxylic acid (B2), e.g. those listed in paragraphs [0085] and [0094] of the specification, has not been demonstrated in the absence of experimental evidence or the indication of technical explanations which would render credible that the effect observed in relation to adhesiveness in the context of Comparative Examples 15, 16 and 21 and Example 22 should be expected to generally take place for any pair of amine compound(s) (B1) and carboxylic acid (B2).

*Use of a silane coupling agent (C)*

3.10 As regards the use of a silane coupling agent (C) in the amounts defined in operative claim 1, the respondent refers to a first table showing a comparison between Examples 7 and 11 or 12 and 13 of the disputed patent and to a second table showing a comparison between Examples 5, 9 and 18 of the granted patent and the comparative example of D8 (Annex 1). Whereas the results shown in the first table seem to demonstrate that the coupling agent ( $\gamma$ -aminopropyltrimethoxysilane) would have no impact on the curability, a comparison of the data obtained for Examples 5 and 9 and in Annex 1 which are summarized in the second table appear to show that the same coupling agent can also have a negative impact on the curability for a similar composition. Reference is also made to paragraph [0103] of the patent in suit indicating that in the case of using a catalyst wherein a carboxylic acid and an amine compound are used together, the addition of a silane coupling agent, in particular, an aminosilane, usually tends to reduce the curing performance. Hence, the use of a silane coupling agent in general, or even more specifically of an aminosilane, cannot be considered to

generally result in improved curability of the composition.

- 3.11 Concerning the effect of a silane coupling agent (C) on the adhesiveness of the cured composition, the term "coupling agents" is usually understood by the skilled person as referring to "adhesion promoters" so that claim 1 by defining the use of a silane coupling agent would also define the use of a silane compound having the ability to promote adhesion. This also is the case in the particular field of the patent in suit, as shown in paragraph [0119] of D7 and in paragraph [0089] of D2 mentioning among others  $\gamma$ -aminopropyltrimethoxysilane. This also is the opinion of the respondent, as shown in the third paragraph of section IV.4.1, on page 4 of the reply to the statement of grounds, which was not disputed by the appellant.

*Conclusion concerning the alleged advantages in terms of curability and adhesiveness*

- 3.12 It follows from the above analysis that whereas curability can be considered to be increased in comparison with the composition of the closest prior art by the use of a trialkoxysilyl terminated polymer (A) the respondent's submissions are not sufficient to demonstrate that curability is similarly influenced by using any pair of amine compound(s) (B1) and carboxylic acid (B2) in a molar ratio of 0.1 or less or by using a coupling agent (C). In addition, taking into account that it was not shown that the use of any pair of amine compound(s) (B1) and carboxylic acid (B2) in a molar ratio of 0.1 or less or the use of a coupling agent (C) would provide at least the same level of curability as obtained in the closest prior art and the fact that the degree of influence of each of the above mentioned

distinguishing features on the curability is unknown, the submissions of the respondent do not allow a quantitative or qualitative comparison of the curability achieved by the compositions according to operative claim 1 and that of the closest prior art, i.e. whether the curability achieved over the whole scope of claim 1 is higher, similar or lower. Based on the functional definition contained in operative claim 1 it can only be concluded that the compositions of operative claim 1 are as that of the closest prior art tin-free curable.

3.13 Concerning adhesiveness, whereas this property can be favorably influenced by the use of a silane coupling agent (C), the respondent's submissions do not allow any conclusion as to how this property is positively or negatively influenced by the use of a trialkoxysilyl terminated polymer (A) or generally by any pair of amine compound(s) (B1) and carboxylic acid (B2) in the molar ratio of 0.1 or less, let alone as to the relative influence of each of the distinguishing features on adhesiveness. Therefore, it cannot be concluded as submitted by the respondent that the compositions of operative claim 1 exhibit in comparison with that of the closest prior art a "preserved adhesiveness".

3.14 It also follows from the above analysis of the evidence relied on by the respondent that the contention in section II.3 of the respondent's letter of 3 June 2020 that the distinguishing features over the closest prior art indeed have a synergistic effect must be considered no more than an unsubstantiated allegation which therefore must be disregarded. Accordingly, the problem solved over the closest prior art can only be formulated, in agreement with the finding of the



opposition division, as the provision of further curable tin-free compositions.

*Obviousness of the solution*

4. It remains to be decided whether the skilled person seeking to solve the problem identified above would, in view of the disclosure of D1, possibly in combination with other prior art documents or with common general knowledge, have modified the composition of Example 2 of D1 in such a way as to arrive at the subject matter of operative claim 1. In case of the existence of more than one distinguishing feature over the prior art and in the absence of any synergistic effect arising from their combination, it has to be examined whether each of these features, taken singly, would be derivable from the prior art in an obvious way when starting from the closest prior art (Case Law, supra, I.D.9.2.2).
- 4.1 Faced with the problem identified in above point 3.14, the skilled person would consider the use of any curable organic polymers having a function similar to that used in the closest prior art, i.e. other organic polymers having reactive silicon-containing groups. The polymers (A) defined in operative claim 1 are known from paragraphs [0007] and [0008] of D1 and also from D7 (paragraph [0014]). Their use therefore would have been suggested by the prior art.
- 4.2 As regards the use of a molar ratio of the total amount of carboxylic acid (B2) to the amounts of amine compound (A1) of 0.1 or less, such amounts are within the broad range taught in paragraph [0040] of D1 according to which it can be as low as 0.01. The respondent's argument that the skilled person would be directed away from the molar ratio of (B2) to (B1) as

disclosed in D1 because it is stated to result in lower curability fails to convince. According to the case law of the boards of appeal, the answer to the question what a skilled person would have done in the light of the state of the art depends in large measure on the technical result he has set out to achieve (see the above cited T 0939/92, reasons Nrs 2.4.2 and 2.5.3). Faced with the problem identified in above point 3.14, i.e. providing further curable compositions, regardless of whether they exhibit improved curability or not, the skilled person would have considered any molar ratio of (B2) to (B1) taught in D1. Thus, the act of choosing an arbitrary range such as that defined in operative claim 1 from the broader range defined in D1 which requires no more than routine experimentation was also an obvious measure for the skilled person.

- 4.3 Concerning the use of a silane coupling agent (C), it has been indicated in above point 3.11 that their use also in the present field of curable resins, in particular those based on organic polymers having reactive-silicon-containing groups, was known in the art (paragraph [0119] of D7 and paragraph [0089] of D2) also for the purpose of improving adhesiveness. As acknowledged by the respondent D1 itself also teaches in paragraph [0042] the use of adhesion promoters. Their use and in particular that of silane coupling agents, e.g.  $\gamma$ -aminopropyltrimethoxysilane was therefore suggested to the skilled person seeking to solve the problem mentioned in above point 3.14. As to the selection of the amount of silane coupling agent (C) defined in operative claim 1, this amount is not linked to the achievement of any particular effect and therefore considered to be arbitrary. The selection of such arbitrary amount is therefore also obvious to the skilled person.

- 4.4 Consequently, the skilled person starting from composition of Example 2 of D1 and wishing to provide further curable tin-free compositions, would have been guided by the available prior art to curable compositions that fall within the ambit of present claim 1. Thus, present claim 1 contains embodiments that are obvious in view of the prior art.
5. As a result, the respondent's main request is not allowable for lack of an inventive step pursuant to Article 56 EPC.

*First to fifth auxiliary requests*

6. The first to fifth auxiliary requests were submitted before the opposition division. There is nothing in the contested decision or the minutes of the oral proceedings showing that the admissibility of the those auxiliary requests was discussed, let alone decided. Accordingly, the admittance of the auxiliary requests needs to be decided. The auxiliary requests having been filed before 1 January 2020, Article 12(4) to (6) RPBA 2020 does not apply (Article 25(2) RPBA 2020) and the question whether or not these auxiliary requests should be admitted must be decided on the basis of Article 12(4) RPBA 2007.
7. Contrary to the requirements of Article 12(2) RPBA 2007, the reply of the respondent to the statement setting out the grounds of appeal does not specify expressly how the amendments introduced with the first to fifth auxiliary requests are considered to overcome the various objections raised in respect of the main request. The respondent's submissions in said reply

concerning these auxiliary requests consist of an identification in section III of the features inserted and the indication of the passages of the patent specification describing those features, the application being merely indicated to contain corresponding passages and in section IV.4.3 of the sole sentence *"In case that in spite of the above considerations, inventive step of the main request should be contested over the whole range of claim 1 of the main request, a detailed examination of the auxiliary requests is appreciated, which set the limits of claim 1 closer to what is exemplified in example 22 of the disputed patent"*.

To the benefit of the respondent and having regard to the significance of Example 22 of the patent in suit in the submissions relating to the main request and the formulation of the problem adopted by the opposition division, the indication that the features inserted in the auxiliary requests set the limits of claim 1 closer to the composition of Example 22 might be understood at the most to mean that the amendments inserted would result in the problem as formulated by the respondent in relation to the main request, i.e. the provision of excellently balanced curability and adhesiveness, to be credibly successfully solved over the full scope of claim 1.

However, the fact that, as put forward by the respondent in letter of 3 June 2020, the auxiliary requests define ranges which are more closely centered around the examples, in particular Example 22, so that the claimed invention's effect explained with reference to the available experimental data is even clearer in the case of the auxiliary requests does not allow it to be concluded that these auxiliary requests were

properly substantiated. In order for this to be the case, the respondent should have explained why the features inserted, i.e. an amine functionality for the silane coupling agent (first auxiliary request), its amount in the range of 1 to 7 parts by weight for 100 parts by weight of the organic polymer(s) (A) (second auxiliary request), the use of trimethoxysilyl-groups as reactive groups or the use of a polyoxyalkylene polymer for the organic polymer (third auxiliary request), the selection of defined compound(s) (B1) as selected from DBU and DBN and a carboxylic acid (B2) selected from versatic acid, 2-ethylhexanoic acid, octanoic acid, oleic acid, naphtenic acid, 2,2-dimethyloctanoic acid, 2-ethyl-2,5-dimethyl hexanoic acid and neodecanoic acid (fourth auxiliary request) or the use of a trimethoxysilyl group and an amino group for the amino silane coupling agent (fifth auxiliary request) were linked to the properties of curability and adhesiveness and therefore were limited in order to ensure that the problem successfully solved by the subject-matter of amended claim 1 was that formulated by the respondent.

The respondent's argument that page 6 of the respondent's reply to the statement of grounds of appeal already indicated that DBU clearly enhanced curability compared to diethylene triamine is not correct. This section solely concerns the main request for which the definition of the amine compound(s) B1 does not, and never was, argued to comprise a feature distinguishing the claimed composition from the closest prior art. Moreover, while a comparison between the curing performance resulting from the use of DBU and diethylenetriamine could have been made on the basis of the curability results and the nature and amount of the components contained in the compositions indicated in

the table on page 6 of the rejoinder, the corresponding section of the rejoinder, as indicated in the last sentence on page 5, explicitly addressed only the influence of the silane coupling agent on the curability. Therefore, the respondent's submissions cannot demonstrate that the selection of the group of amines defined in the fourth and fifth auxiliary requests was accompanied or justified, as far as the reply to the statement of grounds of appeal is concerned, by a substantiation.

Accordingly, the unsubstantiated first to fifth auxiliary requests are not considered to have been validly filed with the reply to the statement of grounds of appeal (Case Law, *supra*, V.A.4.12.5).

8. In response to the Board's communication in which the lack of substantiation of the auxiliary requests had been addressed, the respondent argued with letter of 3 June 2020 that *"the first and the second auxiliary requests closer specify the amino silane (second auxiliary request) and its amount (second auxiliary request), the adhesiveness action of which is to be preserved upon enhancing curability with the claimed invention's specific molar ratio (B2)/(B1) for the polymer having the SiX3 group."* This, however, does not constitute an explanation as to why the use of an amine functionality for the silane coupling agent (first auxiliary request) or its amount defined in the second auxiliary request are believed to lead to the conclusion that the problem as formulated by the respondent has been successfully solved. The vague indication that the auxiliary requests define ranges which are more closely centered around the examples, in particular Example 22, so that the claimed invention's effect is even clearer in case of the auxiliary

requests, does not, in the absence of a more detailed argumentation, allow the Board to study and evaluate in an objective manner whether the argumentation presented is persuasive. Hence, the substantiation for the first and second auxiliary requests provided by the respondent with letter of 3 June 2020 also does not make it possible for the Board to understand and evaluate why the amendments inserted should result in modification of the assessment of inventive step with respect to the main request. Noting that no additional explanation in relation to the third auxiliary request was submitted by the respondent with letter of 3 June 2020, the Board finds it therefore appropriate to make use of the power pursuant to Article 12(4) RPBA by holding the first to third auxiliary requests inadmissible, even in view of the latest submissions of the respondent which do not heal the lack of substantiation of these auxiliary requests, which is contrary to the requirements of Article 12(2) RPBA 2007.

9. Concerning the fourth and fifth auxiliary requests, the respondent indicated with letter of 3 June 2020 that those were more closely centered around the exemplified system with neodecanoic acid and DBU addressed in section 13.7 of the Board's communication so as to define the most efficient curing catalyst components shown in paragraphs [0087] and [0098] of the disputed patent, which are DBU and neodecanoic acid and closely related compounds.

Whereas paragraph [0098] of the specification merely indicates that the group of carboxylic acids now defined in claim 1 of the fourth and fifth auxiliary requests were chosen for their availability and workability, paragraph [0087] of the specification

explains that DBU and DBN are preferred amines, since their high pKa values results in a high catalytic activity. This is understood by the Board to imply that as a result of the use of these specific amines the claimed composition would exhibit improved curability in comparison to the composition of the closest prior art, which improvement should be taken into account in the formulation of the problem. The respondent's submissions concerning these requests however do not address adhesiveness of the cured composition which is a key element of the respondent's submissions in relation to the main request. They do not address the question whether the effect of using a (B1)/(B2) molar ratio of 0.1 or less observed when comparing the data of Comparative Examples 15, 16 and 21 and Example 22 should be expected to generally take place for any of carboxylic acids now defined in claim 1. The mere indication that claim 1 now concerns DBU and neodecanoic acid and "closely related compounds" cannot be considered to implicitly address this issue, as it would have been necessary to explain how these carboxylic acids are meant to be closely related and why this should be considered to render credible that these compounds bring about the alleged advantages in terms of adhesiveness. Therefore the respondent's submissions leave it up to the Board and the opposing party themselves to develop an understanding of why the amendments inserted into claim 1 should change the assessment of inventive step with respect to the main request. Accordingly, the arguments provided in support of inventive step of the fourth and fifth auxiliary requests in the respondent's letter of 3 June 2020 do not constitute a proper substantiation within the meaning of Article 12(2) RPBA 2007. Consequently, the Board makes use of the power pursuant to Article 12(4)



RPBA 2007 by holding the fourth and fifth auxiliary requests inadmissible.

Even if the Board to the benefit of the respondent acknowledged that the fourth and fifth auxiliary requests were properly substantiated, these auxiliary requests should then be considered to have been validly filed and sufficiently substantiated only with the letter of 3 June 2020 (see T 1732/10 of 19 December 2013). Since this would constitute an amendment to the respondent's complete case defined in Article 12(2) RPBA 2007, the admittance of these auxiliary requests would thus have to be considered at the Board's discretion under Article 13(1) RPBA 2007, taking into account the stipulations of Article 13(3) RPBA 2007, the provision of Article 13 RPBA 2007 still applying where the summons to oral proceedings has been notified before the entry into force of the RPBA 2020 (transitional provisions of Article 25(3) RPBA 2020).

According to Article 13(1) RPBA 2007, the Board's 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. While the Board does not find any justification for the late inventive step submissions made in relation to the fourth and fifth auxiliary requests, admitting those requests would not only necessitate addressing the question whether the cured claimed compositions based on the group of carboxylic acids defined in claim 1 could be credibly considered to have improved adhesiveness over the closest prior art, but also whether it has been proven that it was known or suggested in the prior art that DBU and DBN were very effective silanol condensation catalysts. The Board is of the opinion that these crucial points

needed for an assessment of inventive step cannot be dealt with by the opposing party without adjournment of the oral proceedings. On this basis, the Board does not admit the fourth and fifth auxiliary requests into the proceedings (Article 13(1) and 13(3) RPBA 2007).

*Additional procedural issue*

10. The respondent informed the Board by letter of 3 June 2020 that it would not be represented at the oral proceedings and has requested that a decision be taken based on the written content of the file. In this respect the respondent had the opportunity to take position on all the issues on which this decision is based, namely inventive step of the subject-matter of claim 1 of the main request and the finding that the first to fifth auxiliary requests were not deemed to have been filed for lack of substantiation, as they were dealt with in the communication of the Board. The respondent's right to be heard is observed, since the respondent elected not to attend the oral proceedings and thus renounced the possibility to further substantiate his case and requests. As the Board was in the position to decide according to the request of the appellant, the decision could be taken in writing and the oral proceedings were cancelled, as not deemed necessary.

*Additional objections*

11. Having regard to the above finding it is not necessary for the Board to take a decision onto whether to admit D9 into the proceedings. There is also for the same reason no necessity to deal with the objection that the invention of claim 1 lacks sufficiency of disclosure.

**Order**

**For these reasons it is decided that:**

1. The decision of the opposition division is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



B. ter Heijden

M. C. Gordon

Decision electronically authenticated