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Datasheet for the decision of 13 January 2020

Case Number: T 1336/17 - 3.3.09

Application Number: 04012885.2

Publication Number: 1602702

IPC: C09J163/00

Language of the proceedings: EN

Title of invention:
Epoxy adhesive composition

Patent Proprietor:
Dow Global Technologies LLC

Opponent:
Henkel AG & Co. KGaA

Headword:

Relevant legal provisions:
EPC Art. 56, 111(1)
RPBA 2020 Art. 13(1)

Keyword:
Main request and first to third auxiliary requests - Inventive step (no)
Fourth auxiliary request - Prohibition of reformatio in peius

Decisions cited:
G 0009/92, G 0004/93

Catchword:

Europäisches Patentamt
European Patent Office
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Beschwerdekammern

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Case Number: T 1336/17 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 13 January 2020

Appellant: (Patent Proprietor)	Dow Global Technologies LLC 2040 Dow Center Midland, MI 48674 (US)
Representative:	Schaad, Balass, Menzl & Partner AG Dufourstrasse 101 Postfach 8034 Zürich (CH)
Respondent: (Opponent)	Henkel AG & Co. KGaA Henkelstrasse 67 40589 Düsseldorf (DE)
Representative:	Henkel AG & Co. KGaA CLI Patents Z01 40191 Düsseldorf (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 10 April 2017 concerning maintenance of the European Patent No. 1602702 in amended form.**

Composition of the Board:

Chairman	N. Perakis
Members:	A. Veronese
	O. Loizou

Summary of Facts and Submissions

I. This decision concerns the appeal filed by the patent proprietor against the decision of the opposition division that European patent No. 1 602 702 as amended according to the fifth auxiliary request filed during oral proceedings met the requirements of the EPC.

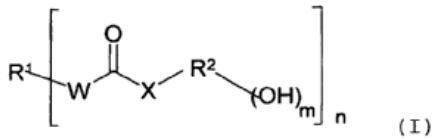
II. Claims 1 as granted reads as follows:

"*1. An epoxy adhesive composition comprising*

a) a first epoxy resin,

b) a second epoxy resin modified with a copolymer based on a 1,3-diene and a polar, ethylenically unsaturated comonomer,

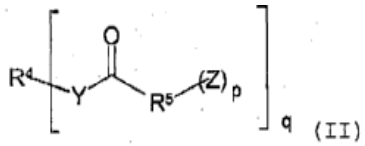
c) a toughener selected from the group consisting of compounds of formula I



(I)

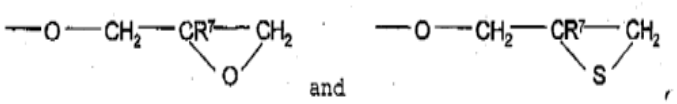
wherein m is 1 or 2, n is 2 to 6, R^1 is an n-valent radical of an elastomeric prepolymer after the removal of the terminal isocyanate, amino or hydroxyl group, the elastomeric prepolymer being soluble or dispersible in epoxy resin, W and X are independently -O- or -NR^3 -, at least one of W and X being -NR^3, R^2 is an m+1-valent radical of a polyphenol or aminophenol after the removal of the phenolic hydroxyl group and optionally of the amino group, and R^3 is hydrogen, a C_1 to C_6 alkyl or phenol,

and compounds of formula II



(II)

wherein p is 1 or 2, q is 2 to 6, Y is -O-, -S- or -NR^6-, Z is a radical selected from the group consisting of -OH, -NHR^6 , -OCN,



R^4 is a residue of a hydroxyl-, mercapto- or amino-terminated polyether prepolymer or of a hydroxyl-, mercapto- or amino-terminated prepolymeric, segmented polyester, polythioester or polyamid, R^5 is a carlaocyclic aromatic or araliphatic p+1-valent radical with groups Z bonded directly to the aromatic ring, R^6 is hydrogen, C_1 to C_6 alkyl or phenol, and R^7 is methyl or hydrogen, and mixtures thereof, characterized by
d) a polymer comprising a polyester segment, said polymer being at least partially crystalline at room temperature and having a softening temperature in the range of 40° to 125°C."

The documents submitted during the opposition proceedings included, inter alia:

D1: WO 00/37554 A1
D14: Dynacoll®7330; Technical data sheet

III. For the decision of the opposition division the claims under consideration were the patent as granted (main request), the first auxiliary request, filed by letter dated 14 September 2015, the second and third auxiliary requests, filed by letter dated 6 January 2017, and the fourth and fifth auxiliary requests, filed during the oral proceedings before the opposition division.

IV. The decision of the opposition division can be summarised as follows.

D14 was admitted into the opposition proceedings, but D10, D11 and D12 were not. The invention defined in the main request and in the first to third auxiliary requests was not sufficiently disclosed. This was because the composition of Example BM 1460.002, which

fell within the claimed scope, did not display a low shear viscosity of more than 19.000 Pas which, according to paragraph [0012] of the patent in suit, was necessary to achieve a high wash-off resistance. The skilled person had to develop a programme of research in order to select polyesters for component d) which induced this effect. The fourth auxiliary request was not admitted into the proceedings. The invention defined in the fifth auxiliary request was sufficiently disclosed, because the composition of example BM 1460.002 did not fall within the claimed subject-matter. This subject-matter was also clear, complied with the requirements of Articles 123(2) and (3) EPC, was novel over D1, D2 and D3 and involved an inventive step over D1, alone or in combination with D14.

V. The patent proprietor (appellant) requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, alternatively that the patent be maintained in amended form on the basis of the claims of one of the first to fourth auxiliary request filed with its statement of grounds of appeal. These requests correspond respectively to the first, second, third and fifth auxiliary requests of the interlocutory decision under appeal.

Claim 1 of the first auxiliary request differs from that of the granted patent in that component d) of the epoxy adhesive composition is "a polyester which is at least partially crystalline at room temperature and has a softening temperature in the range of 40°C to 125°C".

Claim 1 of the second auxiliary request differs from that of the granted patent in that component d) is

additionally defined by a molecular weight in the range from 2000 to 5000 g/mol.

Claim 1 of the third auxiliary request differs from that of the granted patent in that the epoxy adhesive composition comprises 5 to 15 wt% of component d).

Claim 1 of the fourth auxiliary request differs from that of the granted patent in that component d) is additionally defined by a molecular weight of about 3500 g/mol and that the epoxy adhesive composition comprises 5 to 15 wt% of component d).

VI. In its reply to the statement setting out the grounds of appeal, the opponent (respondent) requested that the appeal be dismissed. It also requested that for a discussion on novelty and inventive step the case be remitted to the opposition division.

VII. In a written communication, the board invited the parties to oral proceedings and drew their attention to the points which needed discussion.

VIII. With its letter of 19 December 2019, the respondent filed further arguments on the outstanding issues.

IX. On 13 January 2020 oral proceedings were held before the board. The appellant requested that the respondent's submission filed with the letter dated 19 December 2019, and the inventive step attack based on a combination of D1 and D14, not be admitted into the appeal proceedings.

X. The appellant's arguments, where relevant to the decision, may be summarised as follows.

The respondent's submissions in the letter dated 19 December 2019 and in particular the inventive step objection based on a combination of D1 and D14 were filed late and should not be admitted into the appeal proceedings. This was particularly relevant to discussion of the third auxiliary request, which, according to the conclusions announced orally by the opposition division during the oral proceedings before it, involved an inventive step.

D1 was the closest prior art. The adhesive composition of claim 1 of the main request differed from that disclosed in D1 in that it comprised the polymeric component d). The inclusion of this component gave the claimed composition new properties: at application temperature its viscosity was low; however, after cooling the viscosity measured at low shear rate was high, and thixotropy was observed. These properties were shown in Tables 1 and 3 of the patent in suit. Due to these properties, the composition was wash-off resistant immediately after application. Thus, contrary to the compositions of D1, it did not require a pre-gelling step. It was true that after cooling one of the tested compositions did not have a viscosity of 19000 Pas, as indicated in paragraph [0012] of the patent. However, this value was a preferred requirement and not a specific threshold value for achieving wash-off resistance. Further increases in the viscosity could also occur if the composition was left to stand a for longer period. The difference in viscosity at higher temperature and after cooling was also relevant. As to the thixotropy, the appellant conceded that no evidence of this effect was shown in the patent.

Starting from D1 as the closest prior art, the underlying technical problem was the provision of an

epoxy adhesive composition which resulted in a cured product having high static and dynamic strength and a good corrosion resistance, said composition being wash-off resistant prior to curing, without the need for a pre-curing step, and at the same time being very simple to handle. The skilled person faced with this problem would not have found any suggestion in the prior art of including a polymeric component d) as defined in claim 1 in a composition as defined in D1.

The subject-matter of claim 1 of the auxiliary requests involved an inventive step as well. The additional features of the corresponding claim 1 of each of these auxiliary requests further distinguished the claimed composition from that of D1. Concerning the third auxiliary request, the amount of component d) in claim 1 was different from that disclosed in D1 (Example 1 and Table 1).

XI. The respondent's arguments, where relevant to the decision, may be summarised as follows.

Remittal for the assessment of inventive step was appropriate, because this issue had not been decided by the opposition division in the parts of the appealed decision relating to the main and to the first to third auxiliary requests. If remittal was not granted, inventive step would have to be discussed, also taking into account the objection based on a combination of D1 and D14. This objection had been raised and discussed during the proceedings before the opposition division, as shown in the minutes of the oral proceedings and in the decision under appeal. This objection was also mentioned in the respondent's reply to the statement setting out the grounds of appeal.

D1 was the closest prior art. The adhesive composition of claim 1 of the main request differed from that disclosed in D1 in that it comprised the polymeric component d). As shown in Table 3 of the patent in suit, not all polymers falling within the definition of component d) induced the purported technical effect. The viscosity of the composition of Example BM 1460.002 was even lower than that of the comparative example BM 1480 (1300 vs 5000 Pas). Contrary to the appellant's allegation, the viscosity of this composition could not be expected to increase over time and to reach that which, according to paragraph [0012] of the patent, was needed to give the composition wash-off resistance. Thus, starting from D1, the underlying technical problem could not be formulated as proposed by the appellant, but rather as a less ambitious one, i.e. the provision of an alternative adhesive composition. The skilled person faced with this problem would have considered including in the composition of D1 a polymeric component such as the component d) of claim 1. Such components were known and commonly used for the preparation of adhesives, as shown in the technical data sheet D14, describing "Dynacoll® 7330". Furthermore, claim 12 of D1 mentioned the incorporation of an additional polyester compound (component F) to the adhesive composition. Thus, the subject-matter of claim 1 of the main request did not involve an inventive step. Since the additional features characterising the auxiliary requests did not induce any additional technical effect, these requests did not involve an inventive step either.

Reasons for the Decision

1. *Request for remittal*

1.1 The respondent requested that the case be remitted to the opposition division for the assessment of novelty and inventive step, because no decision had been taken by the opposition division on these issues, at least as far as the main and the first to third auxiliary requests were concerned. Since only the issue of inventive step is assessed in the present decision, the respondent's request is only addressed as far as it relates to this issue.

1.2 The board considers that a remittal is not the appropriate course of action in the present case. Since the issues relevant to the present case, as shown below, have already been dealt with by the opposition division during the opposition proceedings, there is no reason to remit the case (Article 111(1) EPC).
It is not disputed that inventive step was not dealt with in the parts of the written decision of the opposition division relating to the main request and to the first to third auxiliary requests (which are identical to the corresponding requests currently on file). These requests were, in fact, found to lack sufficiency of disclosure because not all claimed compositions achieved the technical effect sought (points 4.0 to 7.0 of the written decision). However, inventive step was discussed extensively in the section of the decision under appeal relating to the fifth auxiliary request (the fourth auxiliary request currently on file). The subject-matter of this request, which was found to meet the requirements of sufficiency, was considered novel and also to involve

an inventive step over a combination of D1 and D14 (point 9.7). Furthermore, according to the minutes of the oral proceedings before the opposition division inventive step of the subject-matter claimed in the main and first to third auxiliary requests was also discussed during the oral proceedings and that respective conclusions were announced orally (see points 3.3 and 4). The written decision and the minutes also show that for assessing the sufficiency and inventive step of all requests the relevant issue was whether component d) induced a technical effect. This issue, which is relevant in the present appeal proceedings, was therefore also dealt with during the proceedings before the opposition division.

2. *Request not to admit into the appeal proceedings certain submissions*

2.1 The appellant requested that the respondent's submissions presented in the letter dated 19 December 2019, and the inventive step objection based on the combination of D1 with D14, not be admitted into the appeal proceedings. Since the present decision only concerns the assessment of inventive step in view of the combination of D1 with D14, the appellant's request is only addressed in so far as it relates to this issue.

2.2 As already indicated above (point 1.2), the inventive step attack based on a combination of D1 and D14 was raised during the proceedings before the opposition division in relation to all requests currently on file. The written decision on this point was issued in respect of the fifth auxiliary request, whereas conclusions on the other requests were only announced orally during the oral proceedings (see minutes).

2.3 In its reply to the statement setting out the grounds of appeal, the respondent stated that it was maintaining the inventive step objection. The appellant argued that this objection was not substantiated and that for this reason all later submissions had to be disregarded.

2.4 As already mentioned above, the opposition division considered that the issue of whether component d) of the claimed adhesive composition induced a technical effect and contributed to the solution of the underlying technical problem was crucial in the context of both sufficiency and inventive step. When examining the main and the first to third auxiliary requests, the opposition division concluded that this effect was not achieved over the entire scope claimed. In view of this conclusion, it decided that the invention claimed in these requests was insufficiently disclosed.

2.5 During the appeal proceedings the board considered that the aforementioned issue was highly relevant and had to be discussed and decided upon in the context of inventive step. In its communication issued in preparation for the oral proceedings, the board had expressed the opinion that the opposition division's finding that sufficiency of disclosure was not complied with because a non-claimed effect was not achieved was not correct, and inventive step was mentioned as a point to be discussed. The board considered that during the oral proceedings both parties should be given the opportunity to present their case on the relevance of component d) in the context of the inventive step attack, and to take into account, at the least, the objection and the documents (D1 and D14) dealt with in

the decision under appeal and during the oral proceedings before the opposition division.

2.6 For these reasons, the board admitted into the appeal proceedings the objection of inventive step based on the combination of D1 with D14 (Article 13(1) RPBA 2020).

Main request

3. *Inventive step*

3.1 The claimed invention relates to an epoxy adhesive composition useful for bonding parts of a vehicle. In the manufacturing process of a vehicle, the body-in-white structure to which the structural adhesive has been applied is usually subjected to spray wash followed by phosphatising and e-coating prior to the final curing of the structural adhesive in the e-coat oven. The invention aims to provide an adhesive which is not washed off during the spray wash step. The idea underlying the invention is to provide a composition having a relatively low viscosity at application temperature but which exhibits a high viscosity at low shear strain after application and cooling down, so as to offer high wash-off resistance without the need for a pre-hardening step (paragraphs [0009] and [0012] of the patent in suit).

3.2 The opposition division decided, and the parties agreed, that D1 represented the closest prior art and that the claimed composition differed from that disclosed in D1 in that it comprised the polymeric component d) defined in claim 1. The board has no reason to deviate from this finding. D1 discloses an epoxy adhesive composition suitable for bonding parts

of a vehicle which is wash-off resistant before the final hardening step (page 6, 2nd paragraph; page 7, 1st and 2nd paragraphs; and claims).

3.3 According to the appellant the idea in D1 was to achieve wash-off resistance by either: a) providing a composition having a low viscosity at application temperature which had to be pre-gelled after application to induce an increase in viscosity, or b) providing a composition having a high basic viscosity. The first approach suffered from the drawback that a pre-gelling step was required during the production process, whereas the second had the disadvantage that the adhesive was difficult to apply.

3.4 The claimed invention was based on the finding that the addition of the polymeric component d) to a composition as described in D1 resulted in an adhesive composition having very low viscosity at application temperature which, when cooled down to room temperature, had high viscosity at low shear temperature and was thixotropic. This high viscosity gave the composition wash-off resistance without the need for a pre-gelling step. This effect was induced by component d). This component softened at high temperatures and re-thickened by partial crystallisation when cooled down to room temperature (paragraph [0012] of the patent in suit).

3.5 As evidence of these properties the appellant referred to Tables 1 and 3 of the patent in suit, and in particular to the composition of sample BM 1460.005. The viscosity of this composition was very low at 45°C (63 Pas: see Table 1) and its yield stress was 420 Pa, indicating that it was very simple to apply. However, after exposing the composition to a temperature of 60°C for 15 minutes and letting it cool down to room

temperature, a viscosity of 19500 Pas was observed (at a shear strain of 0.001 and a frequency of 10 Hz: see Table 3). This viscosity was nearly 4 times as high as that (5000 Pas) observed using a comparative composition which differed from the first one in that it did not contain the component d).

3.6 Relying on these tests, in its statement setting out the grounds of appeal the appellant formulated the objective technical problem as that of "providing an epoxy adhesive composition which results in a cured product having high static and dynamic strength and a good corrosion resistance, said adhesive composition being wash-off resistant prior to curing, without the need for pre-curing, and at the same time being very simple to handle".

3.7 What is in dispute is whether the available evidence allows the conclusion that this problem is solved over the entire scope of the claimed subject-matter.
As noted by the respondent and by the opposition division in its decision, the composition of Example BM 1450.002, which comprises a polymer (Tone 1278) falling within the definition of ingredient d) given in claim 1, does not achieve high viscosity after being heated and then cooled down to room temperature. Its viscosity is 4000 Pas, and thus considerably lower than that of the composition of the comparative example BM 1480 (5000 Pas: Table 3) which, as clarified by the appellant during the oral proceedings before the board, does not comprise a component d).

3.8 The appellant noted that in Example BM 1450.002 the viscosity had increased from 1300 Pas to 4000 Pas after 1 day. A further increase in viscosity could not

be ruled out if the composition was left to stand for a longer period.
This argument is not convincing. In the first place, no credible evidence or argument was provided to support this allegation. Furthermore, it appears credible that, as stated by the respondent, the viscosity will not increase linearly, but rather level off one day after cooling down. Secondly, if the appellant's arguments were accepted, the question of when the viscosity of the other compositions was measured would have to be clarified.

3.9 The appellant has also argued that a viscosity of more than 4000 Pas was not necessary to achieve wash-off resistance: the ratio between the viscosity at the higher application temperature and at room temperature was also important. This ratio was higher for the composition of sample BM 1460.002 than for the comparative example BM 1480.
These arguments are not persuasive either, because they contradict the teaching of paragraph [0012], which attaches a particular significance to a viscosity of more than 19000 Pas for achieving wash-off resistance. Moreover, the viscosity of the composition of sample BM 1480 at 45°C (comparative; 53 Pas) lies among those of the compositions according to the invention, which are considered easy to apply, and its viscosity after cooling is higher (5000 Pas) than that of the composition of sample BM 1460.002 (4000 Pas).

3.10 For these reasons, it is concluded that the composition of sample BM 1460.002 does not fulfil the requirement of being both easy to apply and wash-off resistent. This means that for this composition the distinguishing technical feature, component d), does not contribute to the solution of the technical problem formulated above

in point 3.5, and that that problem is not solved over the entire scope claimed.

3.11 The appellant has also proposed formulating the problem as the provision of an adhesive composition having a ratio of at least 200 between the viscosity at 45°C and that at room temperature. However, this problem cannot be derived from, and even contradicts, the teaching of the aforementioned paragraph [0012].
The appellant further asserted that after cooling the compositions of the invention manifested higher thixotropy than those of the prior art. However, during the oral proceedings before the board it conceded that no such effect was shown in the patent, because the viscosity after cooling was only measured at a low shear rate. Apart from a passing reference in paragraph [0012], the patent does not provide any details or evidence of this effect for any claimed composition, let alone for the composition of sample BM 1460.002. This alleged effect cannot thus be considered either when formulating the underlying technical problem.

3.12 For these reasons it is concluded that, starting from D1, the objective technical problem underlying the claimed invention has to be seen as the provision of an alternative epoxy adhesive composition.

3.13 Faced with this problem, the skilled person would have considered including in the composition of D1 other ingredients typically used in the manufacture of adhesive systems, including Dynacoll® 7330, one of the preferred polyesters used as component d) in the compositions described in the patent in suit. As shown in the technical data sheet D14, Dynacoll® 7330 was already known in the prior art as an ingredient for the manufacture of hot melt adhesives with low melt

viscosity and fast setting properties. There is no evidence that the skilled person would have been dissuaded from adding this ingredient to the adhesive composition disclosed in D1. It is also noted that claim 12 of D1 provides the addition of an additional polymer, a polyesterpolyol, to the ternary adhesive composition described in that document.

3.14 For these reasons, it is concluded that the subject-matter of claim 1 of the main request does not involve an inventive step (Article 56 EPC).

First and second auxiliary requests

4. *Inventive step*

4.1 The subject-matter of claim 1 of the first auxiliary request differs from that of the granted patent in that component d) is a polyester and that of the second auxiliary request in that component d) has a molecular weight in the range from 2000 to 5000 g/mol.

4.2 Since the definition of component d) which is given in both these requests still encompasses Dynacoll® 7330, disclosed in D14, the conclusions drawn in respect of claim 1 of the main request also apply to claim 1 of the first and second auxiliary requests. Thus, the subject-matter of claim 1 of these requests does not involve an inventive step either (Article 56 EPC).

Third auxiliary request

5. *Inventive step*

5.1 Claim 1 of the third auxiliary request differs from that of the granted patent in that the amount of component d) in the composition is from 5 to 15 wt%.

5.2 The appellant argued that, since the opposition division had orally expressed the opinion that the subject-matter of this request involved an inventive step (minutes of the oral proceedings, point 5.2), there was even more reason not to admit the inventive step objection over the combination of D1 with D14. This argument is not convincing. The reasons for admitting the inventive step attack based on a combination of D1 with D14 in the appeal proceedings have already been discussed above (points 2.4-2.6). These reasons apply equally to the third auxiliary request, irrespective of any conclusion announced during the oral proceedings. This is all the more true because a final decision was not taken on this issue and the reasons for the finding were not given.

5.3 The appellant has provided no evidence or argument that the presence of an amount of 5 to 15 wt% of component d) in the adhesive is associated with a new technical effect. For this reason, the selection of this amount is considered to be arbitrary. Nor is any evidence available that the skilled person would have been dissuaded from adding this ingredient in this amount. The appellant noted that Example 1 and Table 1 of D1 described a composition comprising an ester in an amount outside the claimed range. However, this ester was used for the preparation of "component B" of the ternary composition comprising "components A), B) and

C)" described in D1. Thus, the amount shown in Example 1 and Table 1 is not that of an ingredient which is added to that composition and corresponds to the component d) of claim 1.

5.4 For these reasons, the conclusions drawn in respect of claim 1 of the main request also apply to claim 1 of the third auxiliary request. Thus, the subject-matter of this claim does not involve an inventive step (Article 56 EPC).

Fourth auxiliary request

6. *Prohibition of reformatio in peius*

6.1 Since in the present case the patent proprietor is the sole appellant against the interlocutory decision of the opposition division, the principle of prohibition of "reformatio in peius" applies (G 9/92 and G 4/93). Consequently, the set of claims according to the fourth auxiliary request, which is identical to the set of claims regarded by the opposition division as a basis on which the patent could be maintained, cannot be challenged in appeal proceedings.

7. *Other issues*

7.1 In view of the aforementioned conclusions there is no need to elaborate on the issues of novelty and sufficiency of disclosure.

Order

For these reasons it is decided that:

1. The appeal is dismissed.

The Registrar: The Chairman:

K. Exner N. Perakis

Decision electronically authenticated