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**Datasheet for the decision  
of 21 June 2023**

**Case Number:** T 1046/20 - 3.3.03

**Application Number:** 06765982.1

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**Language of the proceedings:** EN

**Title of invention:**  
SOLID THERMALLY EXPANSIBLE MATERIAL

**Patent Proprietor:**  
SIKA TECHNOLOGY AG

**Opponent:**  
L & L Products Europe S.A.S.

**Relevant legal provisions:**  
EPC Art. 54, 56

**Keyword:**  
Novelty - Main Request (yes)  
Inventive step - Main Request (no) - Auxiliary Request 1 (yes)



**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 1046/20 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 21 June 2023**

**Appellant:** L & L Products Europe S.A.S.  
(Opponent) 1, Rue Lindberg  
ZA Activeum, Altorf  
67129 Molsheim, Cedex (FR)

**Representative:** Kutzenberger Wolff & Partner  
Waidmarkt 11  
50676 Köln (DE)

**Respondent:** SIKA TECHNOLOGY AG  
(Patent Proprietor) Zugerstrasse 50  
CH-6340 Baar (CH)

**Representative:** Isler, Jörg  
c/o Sika Technology AG  
Intellectual Property Department  
Tüffenwies 16-22  
Postfach  
8048 Zürich (CH)

**Decision under appeal:** **Decision of the Opposition Division of the European Patent Office posted on 27 February 2020 rejecting the opposition filed against European patent No. 1966267 pursuant to Article 101(2) EPC.**

**Composition of the Board:**

**Chairman** D. Semino  
**Members:** D. Marquis  
A. Bacchin

## Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division rejecting the opposition against European patent No. 1 966 267.

II. Claims 1 and 9 as granted read as follows:

"1. A thermally expansible material comprising :

(a) a solid epoxy resin that is substantially free of (i) liquid epoxy resin and (ii) semi-solid epoxy resin, wherein the content of liquid epoxy resin and semi-solid epoxy resin is from 0% by weight of the epoxy resin content to less than 1.5% by weight of the epoxy resin content of the solid thermally expansible material;

(b) an impact modifier which comprises one or more thermoplastic chemical, the impact modifier is substantially free of rubber; and the thermoplastic chemical has functional groups capable of reacting with the epoxy groups on the solid epoxy resins;

(c) a curing agent; and

(d) a heat-activated foaming agent; whereby said material is adherable to a substrate following heat activation".

"9. A method of reinforcing a substrate within a structure comprising:

(a) applying an uncured reinforcement material to at least a first portion of the cavity, the uncured

reinforcement material comprising:

(i) a solid epoxy resin that is substantially free of liquid epoxy resin and semi-solid epoxy resin, wherein the content of liquid epoxy resin and semi-solid epoxy resin is from 0% by weight of the epoxy resin content to less than 1.5% by weight of the epoxy resin content of the solid thermally expansible material;

(ii) an impact modifier which comprises one or more thermoplastic chemical, the impact modifier is substantially free of rubber; and the thermoplastic chemical has functional groups capable of reacting with the epoxy groups on the solid epoxy resins;

(iii) a curing agent; and

(iv) a heat-activated foaming agent; whereby said material is adherable to the substrate following heat activation; and

(b) heating said structure to at least 150°C, thereby causing the reinforcement material to expand and adhere to at least a second portion of the substrate".

III. The decision under appeal was based, *inter alia*, on the following documents:

D1: US 6,150,428 A

D3: US 2004/0221953

D4: US 6,887,914 B2

D5: S.M. Lee. Reference Book For Composites Technology 1, Technomic Publishing Company Inc., 1989, Chapter 5; pages 79-96

D6: Raj B. Durairaj, Resorcinol; Chemistry, Technology and Applications, 2005, pages 455-457

D7: EP 0 798 354 A1

D42: Experiments filed by the patent proprietor with letter of 11 October 2019

- IV. In their decision, the opposition division admitted document D42 into the proceedings. The granted claims were found to have a basis in the application as filed and to be sufficiently disclosed. The priority claim was not valid. Granted claims 1 and 9 were novel over each of D1 to D4. Starting from D3 as the closest prior art and based on the improvements shown in D42, the problem was the provision of a thermally expansible material having improved brittleness. D3 and D7 failed to lead to the subject-matter of granted claims 1 and 9. Starting from D4 as the closest prior art and in the absence of any evidence of an effect, the problem was to provide an alternative thermally expansible material that was easy to process and had a tack-free surface in its uncured state. There was no teaching in D4 and the prior art that would have lead the skilled person to the subject-matter defined in granted claims 1 and 9. Therefore an inventive step was to be acknowledged and the opposition was rejected.
- V. The opponent (appellant) lodged an appeal against the decision of the opposition division.
- VI. The patent proprietor (respondent) submitted auxiliary requests 1-3 with the reply to the statement setting out the grounds of appeal.
- VII. The parties were summoned to oral proceedings and a communication pursuant to Article 15(1) RPBA 2020 indicating specific issues to be discussed at the oral proceedings was then sent to the parties.

VIII. Oral proceedings took place on 21 June 2023 in the presence of the parties by videoconference.

IX. The final requests of the parties were as follows:

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

The respondent requested that the appeal be dismissed (main request), or that the patent in suit be maintained based on the claims of one of auxiliary requests 1 to 3, submitted with the reply to the statement setting out the grounds of appeal.

Claims 1 and 8 of auxiliary request 1 corresponded to claims 1 and 9 as granted with the following addition at the end of claim 1 and after point (iv) of claim 9:

"wherein the solid epoxy resin comprises 40% to 80%, preferably 50% to 80%, more preferably 60% to 75% by weight of the material, the material being 100%".

The wording of claims 1 and 8 and of claims 1 and 7 of auxiliary requests 2 and 3 respectively is not reported, as it is not relevant to the present decision.

X. The appellant's arguments, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They are essentially as follows:

- The subject-matter of granted claims 1 and 9 of the main request lacked novelty over D3 or D4.

- The subject-matter of granted claims 1 and 9 lacked inventive step over D4.
- The subject-matter of claims 1 and 8 of auxiliary request 1 lacked inventive step over D3 or D4.

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

- The subject-matter of granted claims 1 and 9 of the main request was novel over D3 or D4.
- The subject-matter of granted claims 1 and 9 involved an inventive step over D4.
- The subject-matter of claims 1 and 8 of auxiliary request 1 involved an inventive step over D3 or D4.

### **Reasons for the Decision**

Main request (claims as granted)

1. Novelty over D3 and D4
  - 1.1 The opposition division concluded that the granted claims were novel over the disclosure of D3 and D4. This conclusion was contested by the appellant.
  - 1.2 The appellant cited in particular the composition of Table IV of D3 read in the light of paragraph 87 of that document against granted claims 1 and 9.
  - 1.3 The opposition division concluded that granted claim 1 was novel over D3 as the composition disclosed in Table

IV contained a liquid epoxy resin in an amount (3.28 wt.-%) that was excluded from the definition of the solid epoxy resin component (a) in granted claim 1 (0 wt.-% to less than 1.5 wt.-% of the epoxy resin content of the solid thermally expansible material). It was otherwise undisputed that the composition disclosed in Table IV contained components that fell under the definitions provided for components (b)-(d) defined in granted claim 1. The Board follows completely the analysis of the opposition division as far as the composition of Table IV is concerned.

- 1.4 According to paragraph 87, first sentence of D3, it is contemplated to vary the amounts of the components of the composition disclosed in Table IV by +/- 20%, by +/- 50% or more. The amount of liquid epoxy resin in the composition of Table IV is, however, 3.28 wt.-% of the total composition so that, even considering the largest variation explicitly contemplated in paragraph 87, it cannot be concluded that D3 anticipates an amount of liquid epoxy resin according to granted claim 1, that is from 0% by weight to less than 1.5% by weight of the epoxy resin content of the solid thermally expansible material. Moreover, while the second sentence of paragraph 87 of D3 mentions the possibility of removing, adding or replacing the components of the disclosed composition, such a generic disclosure cannot be seen as a direct and unambiguous disclosure of a specific composition according to Table IV of D3 wherein all components have been maintained with the exception of the liquid epoxy resin.
- 1.5 The Board therefore concludes that granted claims 1 and 9 are novel over D3.

- 1.6 The appellant additionally cited the composition disclosed in the table of columns 5 and 6 of D4 read in connection with the first sentence of the first paragraph of column 4 of that document against the novelty of granted claims 1 and 9.
- 1.7 That composition contains the commercially available compounds Lapox P3 and Lapox P4, both solid bisphenol A epoxy resins, as solid epoxy resins according to component (a) of granted claim 1 . The composition also contains a liquid epoxy resin (Epalloy® 8250) in an amount of 0.26%, which was shown to correspond to 1.06 wt.-% of the epoxy resin content, a quantity according to granted claim 1 (from 0% by weight of the epoxy resin content to less than 1.5% by weight of the epoxy resin content of the solid thermally expansible material). The composition additionally contains a curing agent cyanoguanidine (i.e. Amicure® CG) that corresponds to the curing agent (c) of granted claim 1 and a blowing agent azodicarbonamide (i.e. Celogen® 754A) that corresponds to the heat-activated foaming agent (d) according to granted claim 1.
- 1.8 The opposition division concluded in the impugned decision that the relevant composition of D4 failed to disclose an impact modifier (b) which comprised one or more thermoplastic chemical(s) that had functional groups capable of reacting with the epoxy groups on the solid epoxy resins in combination with the remaining features of claim 1.
- 1.9 It was not disputed that the "Etylene copolymer" identified as an ethylene-methyl acrylate copolymer in the table in columns 5 and 6 of D4 was an impact modifier that had no functional groups capable of reacting with the epoxy groups of epoxy resins. The

appellant, however, contended in appeal that the first sentence of the first paragraph of column 4 disclosing an ethylene methacrylate/glycidyl methacrylate copolymer (EMA/GMA) could be read in combination with the composition of the table in columns 5 and 6.

- 1.10 It is established case law of the Boards of Appeal that a claimed subject matter lacks novelty only if there is a clear and unmistakable teaching of the combination of the claimed features in the document of the prior art (Case Law of the Boards of Appeal, 10th Edition 2022, I.C.4.2). There is, however, no element in D4 that would lead the skilled reader to understand that the ethylene methacrylate/glycidyl methacrylate copolymer (EMA/GMA) mentioned in the passage cited in column 4 was part of the composition disclosed in columns 5 and 6 or should be read in combination with it. That passage mentions a possible preferred embodiment but there is no further information leading to the direct and unambiguous disclosure of a composition according to the table in columns 5 and 6 with an ethylene methylacrylate copolymer (EMA/GMA) in place of Optema TC 120.
- 1.11 It follows that the composition in the table of columns 5 and 6 of D4 does not disclose an impact modifier which comprises one or more thermoplastic chemical, the thermoplastic chemical having functional groups capable of reacting with the epoxy groups on the solid epoxy resins.
- 1.12 A further point of dispute concerned the definition of the specific impact modifier as being "substantially free of rubber". The composition disclosed in the table of columns 5 and 6 contained bisphenol A epoxy-CTBN rubber adduct (commercially available product RK8-4)

which was identified as an impact modifier in the contested decision (page 10, fourth paragraph). That was also the view of both parties in appeal (statement of grounds of appeal of the opponent, page 15, fifth paragraph; rejoinder of the patent proprietor, section 4.4). According to the contested decision the presence of such an impact modifier was excluded from the scope of operative claim 1, an argument that was also made by the respondent in appeal.

1.13 Granted claim 1, however, only excludes rubber from the impact modifier fulfilling the condition set out in point (b) of the claim. The open formulation ("comprising") of the claim does not exclude the presence of further impact modifiers in the composition that are not according to the definition given in (b). These impact modifiers can contain rubber such as the bisphenol A epoxy-CTBN rubber adduct (Epoxy in the table). The condition of the specific impact modifier being "substantially free of rubber" does not constitute therefore an additional distinguishing feature.

1.14 In view of this analysis, granted claims 1 and 9 are also novel over the disclosure of D4.

2. Inventive step over D4

2.1 D4 was considered to be a document representing the closest prior art in the decision of the opposition division and the objection of lack of inventive step starting from D4 was pursued in appeal. The opposition division (contested decision, page 14, penultimate paragraph) as well as the appellant (statement of grounds of appeal, page 17, second paragraph) and the respondent (rejoinder, section 5.1.1) considered that

the example disclosed in the table of columns 5 and 6, which is presented as a preferred embodiment in D4, was the most relevant starting point. The Board does not see any reason to depart from that view.

- 2.2 Starting from D4 as the document representing the closest prior art, it has been established that granted claim 1 differs from the composition in the table of columns 5 and 6 in that the thermoplastic chemical contained in the impact modifier has functional groups capable of reacting with the epoxy groups on the solid epoxy resins (sections 1.11-1.14 above).
- 2.3 The opposition division concluded in the impugned decision that it had not been shown that that distinguishing feature was associated with a technical effect. The problem was to provide an alternative thermally expansible material (section II.4.6.2).
- 2.4 The respondent contended in appeal that the presence of reactive groups on the impact modifier had an effect (section 5.1.2 of the rejoinder) disclosed in paragraph 27 of the application as filed (paragraph 22 of the patent in suit), namely that the impact modifier brought a surprising degree of processability to the solid thermally expansible material, given the absence or substantial absence of rubber, liquid epoxy resin, or semi-solid epoxy resin. The respondent, however, exclusively relied on that passage of the patent in suit and did not provide factual evidence of the presence of this effect.
- 2.5 The established case law about alleged technical advantages of the claimed subject matter over the closest prior art is unambiguous (Case Law, *supra*, I.D. 4.3.1). Alleged advantages to which the patent

proprietor merely refers, without offering sufficient evidence to support the comparison with the closest prior art, cannot be taken into consideration in determining the problem underlying the invention and therefore in assessing inventive step. That is especially the case when the alleged effect is neither self-evident nor predictable. In such a case, the burden of proving the allegation that the claimed invention provides a technical effect is on the patent proprietor. Since the effect was not supported by factual evidence in the present case, it cannot be taken into account when formulating the technical problem over the closest prior art.

- 2.6 Moreover, the passage cited by the respondent links the alleged effect to a specific impact modifier, an ethylene vinyl acetate with maleic anhydride (EVA with MAH) and there is no information in the patent in suit from which it could be concluded that the alleged effect applied to the broader class of impact modifiers (b) defined in operative claim 1.
- 2.7 Under these circumstances, the Board finds that the technical problem solved over the example of D4 is, as formulated by the opposition division, the provision of further thermally expansible materials.
- 2.8 Starting from the sole example of D4 in the table of columns 5 and 6, the skilled person, aware of the teaching of the description of that document, would have consulted the passage of column 4, lines 2-8 contemplating the use of ethylene methyl acrylate EMA/GMA (glycidyl methyl acrylate), a copolymer having groups that can react with epoxy resins, as an impact modifier. That is sufficient for the skilled person, simply looking for further materials, to consider the

use of an ethylene methyl acrylate EMA/GMA (glycidyl methyl acrylate) as an obvious alternative to the ethylene-methyl acrylate copolymer used in the composition of the table of columns 5 and 6, especially since that substitution does not involve further modifications of the composition.

- 2.9 The Board concludes that granted claim 1 lacks an inventive step over D4. The same conclusion applies to the method of granted claim 9 in particular in view of the method disclosed in column 6, lines 24-36 and in Figure 3 of D4.

#### Auxiliary request 1

### 3. Inventive step

- 3.1 Claim 1 of auxiliary request 1 corresponds to granted claim 1 further limited in that "the solid epoxy resin comprises 40% to 80%, preferably 50% to 80%, more preferably 60% to 75% by weight of the material, the material being 100%". Claim 8 corresponds to granted claim 9 amended accordingly.

### 3.2 D4 as closest prior art

- 3.2.1 Novelty of the claims of auxiliary request 1 was not called into question. It was in particular acknowledged by the parties that the limitation of the amount of solid epoxy resin in the composition to the range of 40% to 80% by weight of the material in claim 1 of auxiliary request 1 constituted a further distinguishing feature over D4 by comparison to claim 1 of the main request.

3.2.2 As already analysed in point 1.7 above, the table in columns 5 and 6 of D4 lists three components that are epoxy resins of the composition of interest, namely the components "Solid epoxy resin" which are the commercially available products Lapox P3 and Lapox P4 identified as bisphenol A epoxy resins and the component "Liquid epoxy resin" which is the commercially available product Epalloy 8250 identified as an epoxy phenol novolac resin. Among these components, only Lapox P3 and Lapox P4 are solid epoxy resins that correspond to component (a) of operative claim 1. The combined amount of these solid epoxy resins (24.24 % by weight) is, however, below the range of 40-80% by weight defined for component (a) in claim 1 of auxiliary request 1, a conclusion that was not disputed in appeal.

3.2.3 The composition of claim 1 of auxiliary request 1 therefore differs from the composition of the table of columns 5 and 6 in D4 (i) in that the thermoplastic chemical contained in the impact modifier has functional groups capable of reacting with the epoxy groups on the solid epoxy resins as set out in point 2.2 above and (ii) in that the amount of solid epoxy resin is from 40% to 80% by weight of the material.

3.2.4 The parties agreed that distinguishing features (i) and (ii) over D4 were to be treated independently from one another in the assessment of inventive step. Indeed, the respondent did not claim that any effect was related to the presence of the two features in combination. As far as distinguishing feature (i) relating to the impact modifier is concerned, the reasoning of inventive step given for the main request equally applies to claim 1 of auxiliary request 1.

- 3.2.5 As to distinguishing feature (ii), the amount of solid epoxy resin (a) in the thermally expansible material (40% to 80% by weight) defined in claim 1 of auxiliary request 1 is discussed in paragraph 20 of the patent in suit but it is not associated with any effect nor was any evidence of such an effect provided by the respondent. Starting from the composition disclosed in the table of columns 5 and 6 of D4, the problem, as for the granted claims, remains therefore the provision of further thermally expansible materials.
- 3.2.6 The question of obviousness with respect to the amount of solid epoxy resin in the thermally expansible material is whether the skilled person starting from the composition disclosed in the table in columns 5 and 6 of D4 containing 24.24% by weight of epoxy resins would consider using an amount in the range of 40% to 80% weight of solid epoxy resin in that composition when looking for a further one.
- 3.2.7 The Board finds that the skilled person would not use more than 30% by weight of solid epoxy resins in the composition disclosed in the table of columns 5 and 6 of D4. The general teaching of D4 is indeed to use less than 30% by weight of epoxy-based resins, which according to column 4, lines 15-24 can be solid or liquid. In particular, all the exemplary compositions described in columns 2, 3 and 5 and claim 1 mention an amount of epoxy-based resin of less than about 30% by weight in line with the limitation in claim 1 (it was acknowledged by the appellant that the reference in brackets to "<45%" in claim 1 was a typographical error, as confirmed by the passage in column 5, lines 22 to 33 of D4, see statement of grounds of appeal, pages 20/21).

- 3.2.8 Even considering the passage in column 4, line 16 of D4 mentioning an amount of epoxy-based resin of up to less than 45% by weight in the composition (in apparent contradiction with the rest of the disclosure), there is no teaching in D4 to use 40-80% by weight of solid epoxy resins because epoxy-based resins according to D4 and in particular according to that passage are not necessarily solid.
- 3.2.9 The appellant argued on the basis of the passage in column 4, lines 11-19 that the materials of D4 could, in addition to the epoxy-based resin, contain up to less than 40% by weight of an "epoxy" component. D4 would therefore teach combined amounts of epoxy component and epoxy-based resin (up to less than 70% by weight) in the range of 40-80% by weight as defined in claim 1 of auxiliary request 1.
- 3.2.10 There is however no indication in D4 that the "epoxy" component is an epoxy resin. D4 in fact makes a consistent distinction in the definition and in the amounts of the "epoxy" component and the epoxy-based resin. That distinction is also apparent in the passage on column 4, lines 10-24 in which the "epoxy" component and the epoxy-based resin are exemplified. The Board therefore finds unambiguous from D4 that only the epoxy-based resin can be seen as an epoxy resin in the sense of claim 1 of auxiliary request 1. The amounts of the "epoxy" component and the epoxy-based resin can therefore not be considered in combination with one another to represent an amount of solid epoxy resin as defined in claim 1 of auxiliary request 1.
- 3.2.11 D4 therefore does not indicate that solid epoxy resins could have been used in an amount of 40-80% by weight starting from the amount of 24.24% by weight disclosed

in the table of columns 5 and 6. On the contrary, a limitation is put on the amount of solid-based resin which would lead the skilled person not to go beyond that limitation.

3.2.12 The appellant also argued that paragraph 23 of D3 showed that reinforcement materials could contain up to about 80% by weight or more of an epoxy resin that could be solid or liquid (paragraph 24). The Board, however, does not find that the passage cited by the appellant in D3 show that the skilled reader of D4 would have found in D3 any hint to go against the clear teaching of D4 to limit the range of epoxy-based resin in the composition to up to less than 30% by weight. Moreover, the example of Table IV of D3, which was found to be the most relevant material of D3, only contains 36.08% by weight of solid epoxy resin in the composition and therefore does not support the argument made by the appellant.

3.2.13 The Board therefore concludes that claim 1 of auxiliary request 1 was not shown to lack an inventive step over D4. The same conclusion applies to the method of claim 8 which refers to the composition defined in claim 1 and for which no separate arguments were presented by the parties.

3.3 D3 as closest prior art

3.3.1 The objection of lack of inventive step over D3 raised against granted claims 1 and 9 was pursued against claims 1 and 8 of auxiliary request 1. The appellant relied on their argumentation provided in writing with the statement of grounds of appeal (section 6.3) as well as in their letter of 5 July 2021 (section 3). That argumentation is based on the composition

disclosed in Table IV of D3 as the most relevant starting point.

- 3.3.2 It has been established that granted claim 1 differs from the composition of Table IV of D3 in the amount of liquid epoxy resin (see point 1.3, above). Operative claim 1 defines a range of "from 0% by weight of the epoxy resin content to less than 1.5% by weight of the epoxy resin content of the solid thermally expansible material". The amount of liquid epoxy resin in the composition of Table IV is , however, 3.28% by weight of the overall composition. That difference is also found in claim 1 of auxiliary request 1. Moreover, claim 1 of auxiliary request 1 requires that the amount of solid epoxy resin is 40% to 80% by weight of the material. The amount of solid epoxy resin disclosed for the composition in Table IV of D3 is 36.08% by weight.
- 3.3.3 While the two distinguishing features of claim 1 of auxiliary request 1 over D3 relate to component (a), it was undisputed that these features were independent from one another as far as the properties of the thermally expansible material were concerned. They can therefore be addressed separately in the assessment of inventive step of claim 1 of auxiliary request 1 over D3.
- 3.3.4 The opposition division concluded that the experimental report D42 established the presence of an improved brittleness of the material linked to the limitation of the amount of liquid epoxy resin in component (a) defined in granted claim 1 (contested decision, last paragraph of page 12 and first paragraph of page 13).
- 3.3.5 The appellant argued that D42 was not relevant to the question of inventive step because (a) the alleged

technical effect did not find a basis in the application as filed so that post-published evidence should be given no weight; (b) the experimental design did not allow to draw conclusions with regard to the technical effect of the distinguishing feature; and (c) the alleged technical effect *prima facie* did not exist over the whole breadth of the claims (see point 6.3.2 of the statement of grounds of appeal). The respondent considered on the basis of D42 that not only brittleness but also the tack free surface and the processability properties of the material were shown to have been improved over D3 (see section 5.2 of the rejoinder).

- 3.3.6 The Board cannot follow the first argument of the appellant (point (a) in the previous paragraph) because paragraph 7 of the application as filed provides a basis for an effect relating to brittleness and tack of the expansible material. That passage concerns the amount of liquid epoxy resin in component (a) by mentioning the condition that the material should be substantially free of liquid and semi-solid epoxy-resin (which is defined in paragraph 21 as meaning from 0% by weight of the epoxy resin content to less than 1.5% by weight of the epoxy resin content of the solid thermally expansible material). It is also apparent from lines 9 to 12 of paragraph 7 ("[...] because there is substantially no presence of a liquid epoxy resin or a semi-solid epoxy resin sufficient to migrate to the outer surface of the material to cause such tack. Surprisingly, the uncured solid thermally expansible material is not brittle.") that the tack and brittleness of the materials are linked to the amount of liquid epoxy resin in the material according to claim 1 of auxiliary request 1. Therefore the first argument of the appellant does not hold.

- 3.3.7 D42 describes the preparation of materials based on the composition of claim 1 of auxiliary request 1. All compositions contain more than 40% by weight of solid epoxy resin and the amounts of liquid epoxy resins (DER 331) are varied between 0% by weight and 10% by weight while maintaining the total amount of epoxy resins the same. The appellant argued that the comparison made in D42 was invalid since the amount of solid epoxy resin in the composition was not the same for all compositions.
- 3.3.8 However, given the definition of the amount of liquid epoxy resin and semi-solid epoxy resin being from 0% by weight to less than 1.5% by weight of the epoxy resin content of the solid thermally expansible material, the Board finds that it was appropriate to vary the amount of liquid epoxy resin in D42 against the amount of solid epoxy resin in the composition in order to provide a meaningful comparison among composition with the same total content of epoxy resin, which is the basis for the calculation of the distinguishing feature. Furthermore, the amount used in example F of D42, which is a comparative example, since the amount of liquid epoxy resin is outside the range of operative claim 1, exactly corresponds to that used in Table IV of D3 (3.28% by weight).
- 3.3.9 The table on page 3 of D42 reports the results of the measurements of tack property (at 23°C and 60°C) and drop test (brittleness) for examples B (according to claim 1 of auxiliary request 1) and F-H (comparative compositions). The data reported show that the material of example B has less tack (at 60°C) and is less brittle than all other comparative materials (Examples

F-H).

3.3.10 Example B is the only example in D42 that is according to claim 1 of auxiliary request 1 and it corresponds to a material that does not contain a liquid epoxy resin (0% by weight of DER 331). While D42 does not contain further examples of materials that contain a liquid epoxy resin in an amount within the limitation of operative claim 1, the continuous progression of the values reported for the drop test (8.25mm (B); 12.5mm (F); 17.5mm (G); 20.5mm (H)) with increasing amounts of liquid epoxy resin from example B to example H (0% (B); 3.28% (F); 5% (G); 10% (H)) makes it credible that the effect on brittleness shown in the table is also present for amounts of liquid epoxy resins over the range defined in claim 1 of auxiliary request 1. In this respect, no counter evidence was presented by the appellant.

3.3.11 In view of this, the Board finds that the problem over D3 that was set out in the contested decision, namely the provision of a thermally expansible material having improved brittleness (in the sense of improved resistance to brittleness), was shown to be solved and can be maintained. The solution to that problem, as set out in paragraph 8 of the patent in suit and established in D42, is the use of an epoxy resin component (a) with a limitation in the content of liquid epoxy resin as defined in claim 1 of auxiliary request 1.

3.3.12 The appellant argued on the basis of paragraph 87 in D3 that the amounts of the components of the composition shown in Table IV could be varied by +/- 20%, +/- 50% or more or entirely removed. There is however nowhere in D3 nor in the prior art cited by the appellant a

motivation for the skilled person to specifically remove or lower the amount of liquid epoxy resin disclosed in the composition of D3 in order to solve the problem posed. Also document D7, cited by the appellant on page 24 of their statement of grounds of appeal only in the context of the tack properties of epoxy resins, does not provide the required motivation.

- 3.3.13 The Board therefore comes to the conclusion that claim 1 of auxiliary request 1 involves an inventive step over D3 already on the basis of the first distinguishing feature identified above (see point 3.3.2). In view of this, there is no need to analyse the relevance of the second distinguishing feature. The same conclusion applies to the method of claim 8 of auxiliary request 1 which is based on the material of claim 1 and for which no separate arguments were provided by the parties.
4. As none of the objections of the appellant against the claims of auxiliary request 1 is successful, the patent is to be maintained on the basis of these claims.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of claims 1 to 11 of auxiliary request 1 filed with the reply to the statement of grounds of appeal after any necessary consequential amendment of the description.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated